HUGH REES LT

A. G. Davidson

May 1920

FLOWER GROUPING FOR COLOUR EFFECT
(TIGER LILIES AND TROPÆOLUM)

EVERYMAN'S
ENCYCLOPAEDIA OF

GARDENING

BY

WALTER P. WRIGHT

LONDON AND TORONTO
J. M. DENT & SONS LTD.
NEW YORK: E. P. DUTTON & CO. INC.

ALL RIGHTS RESERVED
PRINTED IN GREAT BRITAIN AT
THE TEMPLE PRESS, LETCHWORTH, HERTS.
FIRST PUBLISHED 1911
REPRINTED . 1913, 1918, 1921, 1929
REVISED AND ENLARGED . . 1930

PREFACE

THE issue of a new and enlarged edition of Everyman's *Encyclopaedia of Gardening* reflects the increased interest in Horticulture and the great and ever-growing demand for information about plants and gardens.

In Gardening, as in other of the arts, crafts, and industries of the present day, events move swiftly. New species are introduced by collectors, and new hybrids and varieties come from the hands of raisers, week by week. Not only so, but new methods of cultivation are tried, and (not least important) fresh remedies are found for the innumerable insect and fungus pests which impede the efforts and add to the expenses of growers.

A faithful attempt has been made to deal with these innovations and developments in the present volume. One of the difficulties inherent in preparing it has been the selection of genera, species, and varieties. How find room for the new without excluding the old, many of which are as well worth growing as ever they were, apart from having the appeal of old and valued friends? One step, a bold and also an exceedingly helpful one, has been to increase the number of pages by approximately fifty per cent. This is a considerable matter in itself, stimulating warm gratitude to one's publishers.

Another has been to apply, both as to old and new species, a rigorous course of selection. It is far from being the case that every newly-introduced species, and every newly-raised variety, is superior to the best of its predecessors. Therefore new, equally with old, need to be considered and assessed. But this is not an easy task. Many writers and speakers in the past have begun with assurances of restriction, and ended by giving detailed descriptions of hundreds of plants of little horticultural value—a course both tiresome to themselves and misleading to their readers. In the present pages the winnowing has been drastic, and only the really important members of each genus accepted. These are succinctly described, their colours, heights, and seasons of flowering, as well as their cultural requirements, being stated tersely.

Varieties have proved scarcely less of a problem than species, because new appear almost every day. The line of least resistance in this case is to drop them altogether, leaving the reader to

acquire information through his gardening paper: and that course has proved an irresistible lure to many authors. It is not, however, a fair, much less an heroic, one. There are standard varieties of fruits and vegetables, and in some cases of flowers, which are as stable as species, and may be as safely recommended. Other plants, Sweet Peas for example, are in such a state of flux that the variety of to-day is supplanted to-morrow. In such circumstances no fixed rule holds. Each plant has to be considered separately, and that course has been adopted in this work.

One may legitimately proceed to call attention to an array of features in the present encyclopaedia which are commonly absent from others, large or small. For one thing, the fruits of modern research into methods of controlling the most important insect and fungus enemies of crops have been carefully garnered. In most cases these pests are dealt with under the crops which they infest, and remedies stated.

Another of no mean proportions is that apart from the ample, if terse, treatment of every plant of importance in its proper chronological order—in other words, of each genus, species, and variety as an individual—detailed articles are given in which the plants are dealt with as groups or collective components of the garden, e.g. Alpine Plants, Herbaceous Plants, Fruit, Trees, etc. See the Introductory Memoranda which follow the Preface.

Thirdly, plant-names have had careful consideration. Sympathetic treatment has been given to English and vernacular names, which have been used wherever possible. And where, as is the case in connection with many hundreds of genera, the Latin and Greek names are used, a guide to their pronunciation is given. Both English and classical names are used with a great many plants.

The botanical orders are quoted under each subject, in case there are readers who wish to link their Gardening and their Botany, and with the same consideration in view, a list of the principal orders, with examples of popular genera in each case, is given in an adjoining table.

Furthermore, the principal horticultural and botanical terms used are quoted and explained in their several alphabetical stations. Gardening history, the scientific and practical principles underlying cultivation, and the classification of insects, with other matters, are treated in the Introductory Memoranda in a way which one hopes may add to the interest of the book, in spite of their unavoidable brevity.

WALTER P. WRIGHT.

1930.

INTRODUCTORY MEMORANDA

I. HISTORICAL

To lovers of gardens and growers of plants, whose name in these days is legion, there is deep fascination in a survey of the circumstances under which Gardening as we know it has developed. Such a view embraces all history, all climes, all races; for Gardening has been pursued through the ages, in every country, by various peoples. Let us therefore cast a glance at the stages which have operated in the great march of horticulture—stages extending, in the words of a great newspaper when reviewing the monumental work[1] which the present author was privileged to edit for the publishers of Everyman, " from Eden to Kew." It was there shown that Gardening began in that shadowy past when nomadic tribes first formed primitive settlements, making rude enclosures for their flocks and herds, tilling the ground thus acquired, and sowing crops to provide food. The earliest dwellers, therefore, in the Nile delta pursued some sort of gardening.

And the more closely we examine the records of ancient Egypt, the more we are struck by the love of the early Egyptians for plants and gardens—by their reverence for trees; by their culture of the Acacia, the Sycamore and the Palm; by the scenes they illustrated of early houses and gardens linked with names, such as Tutankhamen and Amenophis, grown familiar through the remarkable results of recent exploration; by their wall paintings in the tombs of Thebes and of Sennefer; by their records of the primitive gardens of the dead; by their consecration of plants to religion; by their plans of early houses and gardens; and not least by their garden songs.

But western Asia and India also teach their lessons, as we learn when we survey the vineyards of the early Sumerian kings, the parks of Sennacherib, the hanging gardens of Semiramis, the writings of Xenophon on the Persian parks, the garden burials of the Israelites, the gardens of Buddha in Ceylon, and the garden temples.

Nor do we lack evidence of early interest in Gardening when we pass to ancient Greece, there to see the famed garden of Alcinous, the gardens of Adonis, the philosophers' gardens, the gardens in Grecian romances, the sacred groves, the gardens in Homeric poetry, the festivals with their garlanding, the parks of Daphne, and the garden streets of Hellenistic towns.

We examine, too, the records of life in the Roman Empire, with their stories of the " hortus " or garden villa, linked with such historic names as Cicero, Scipio, and Seneca; and with their descriptions of the gardens

[1] "A History of Garden Art," by Marie Luise Gothein, English edition edited by Walter P. Wright, published by J. M. Dent and Sons Ltd.

of Cæsar and Antony, of the balcony-gardens of Rome, of the gardens of the Emperors, of the gardens on Vatican territory, of the gardens of the Domitians, of the gardens of Sallust, of the wall pictures of gardens in the villa of Livia, and of many other famous places and people with their villas and gardens. We see Pliny at work in his summer-house, and share his joy when the smell of Violets steals in. We examine these records, I repeat, and learn to realise in some measure the important part played by gardens in the great days of Rome.

We pass on through many centuries to the time of the Renaissance, and find striking evidence of progress in the wonderful gardens of the great Italian nobles: the gardens of the Palazzo Doria at Genoa, of the Villa d'Este at Tivoli, of the Villa Imperiali at Pesaro, of the Villa Borghese at Frascati, the Farnese gardens, and the Papal gardens at the Quirinal.

But not in Italy alone; France too had her Renaissance gardens, the fruit, in many cases, of Charles the Eighth's march into Italy—such distinguished places as the castle gardens of Amboise, Blois and Bury; the gardens of Chenonceaux and Verneuil; and later, the gardens of Saint-Germain-en-Laye, of Fontainebleau and of the Luxembourg. Bernard Palissy, Olivier de Serres, and Claude Mollet spread the influence of gardens in France through their writings.

In England, Hampton Court, with its still famous gardens, came into being. Nonsuch, Theobalds, and Hatfield House made their mark. Holinshed's *Chronicle*, Bacon's essay and the *Hortus Pembrochianus* had many responsive readers. Oxford Botanic Garden was founded. John Evelyn wrote of what he had seen in France and Spain.

True, these things were not the beginnings of Gardening in Great Britain. Thomas Tusser's *Hundred Good Points of Husbandrie* (1557) anticipated Evelyn's visit to Spain (1650) by nearly a century. Nor must we forget John Parkinson with his famous *Paradisus*, Gerard with his equally famous *Herbal*, or (earlier still) Leland and his *Itinerary*, with descriptions of gardens in Yorkshire and Derbyshire.

It seems certain that a love for special flowers, such as are now called "florists' flowers," grew up in England consequent on the immigration of Flemish weavers at the middle of the sixteenth century; just as a market-gardening industry grew up at Sandwich in Kent from the same cause.

Under the hegemony of Louis XIV Gardening as pursued by royalty and the nobles developed its most spacious, most costly, and most grandiose phase. At Versailles, at Marly-le-Roi, and at other places Le Roi Soleil set examples of horticultural splendour which reacted throughout the whole of Europe—in Italy, in Germany, in Holland, in Sweden, in Denmark, in Spain and in Russia. England and Scotland both felt their influence. But a reaction against formalism set in during the seventeenth century, under the influence of Addison and Pope. And in the eighteenth Sir William Chambers set afoot a movement towards a new style of landscape gardening as a consequence of his journeys in China.

It would be interesting to quote, if space permitted, from the writings of Pope, Addison, Whately, Worlidge, Mason, Price, T. A. Knight, R. P. Knight, Sir William Chambers, J. C. Loudon, and others in the seventeenth, eighteenth, and early nineteenth centuries relating to gardening in England. It must suffice to note Loudon's opinion,

published in 1822, that " the use of gardens is perhaps more general in Britain than in any other country, if we except Holland."

And this brings us to modern times. Has the balance changed after one hundred years? Probably not, or if at all, then in the direction of cancelling the one exception made by Loudon. For Thomas Andrew Knight's pioneer work in hybridisation set others to work, while the writings of Charles Darwin aroused intense interest. Laxton, Eckford, Bennett, Culverwell, McLean, Douglas, Rivers, Dickson, Paul, Kelway, Martin-Smith, Michael Foster, Burrell, Barr, Engleheart, and Dykes among raisers; with William Robinson, Gertrude Jekyll, Harry J. Veitch, and Reginald Farrer as both great gardeners and great writers; and with E. H. Wilson, R. Farrer, Kingdon Ward, G. Forrest, and W. Purdom among collectors—these and others have been the means of stimulating interest by precept, by example, and by the provision of new species and varieties.

And so it comes about that, in the words of the Poet of Empire, " Our England is a garden," where people of all classes and of all ages pursue the pleasant and healthful art with both corporeal and spiritual benefit.

II. PRINCIPLES OF PLANT GROWTH

THE teaching of Botany in schools and universities may be supposed to have exercised a beneficial influence on the progress of Gardening in Britain, and while the present work is in no sense botanical, it is suggested that would-be gardeners as well as botanists make a study of the structure and functions of plants in some such course as the following:

(*a*) THE STRUCTURE AND FUNCTIONS OF ROOTS. The Hypocotyl and Epicotyl; the Radicle; Geotropism and Heliotropism; the Tap root; the Root cap; Fibrous roots; Root hairs; Propagation by roots; Aerial roots; Adventitious roots; Roots which supply human food; Floating roots; Supporting roots; Roots as food stores; Absorption; Osmosis; Effects of soil conditions on root-production; Root nodules; Symbiosis; Root-cuttings; Root-grafting.

(*b*) THE STRUCTURE AND FUNCTIONS OF STEMS. Epicotyl; Plumule; Epidermis; Cortex; Bark; Vascular bundles; Cambium; Hard and Soft basts (Phloem); Sieve tubes and Companion-cells; Wood (Xylem); Medulla and Medullary rays; Scale stems; Tubers; Bulbs; Rhizomes; Annual, Biennial and Perennial Stems; Climbing and twining stems; Grasses and tillering; Stolons (Runners); Suckers; Corms; Storage of plant-food in stems; Nodes and Internodes; Stem-cuttings; Stem-grafting; Layering; Floral stems; Plant stems used as food.

(*c*) THE STRUCTURE AND FUNCTIONS OF LEAVES. Protoplasm; Chlorophyll; Chloroplasts (Chlorophyll granules); Leucoplasts; Chromoplasts; Cellulose; Nucleus; Cytoplasm; Cell-sap; Vacuoles; Palisade cells; Spongy parenchyma; Stomata; Photosynthesis or Assimilation; Respiration; Transpiration; Vernation; Venation; Scales; Buds; Stipules; Bracts; Leaf-fall; Plants grown for the use of their leaves and buds as food.

(*d*) THE STRUCTURE AND FUNCTIONS OF FLOWERS AND INFLORESCENCES. Regular and Irregular Flowers; Calyx; Corolla; Stamens,

anthers, and pollen (Andraecium); Perianth; Pistil (Gynaecium); Definite and Indefinite Inflorescences; Perfect and Imperfect Flowers; Wind Pollination; Adaptations to insects; Objects of colour and perfume; Nectaries and Honey; Cross- and Self-fertilisation; Hybrids; the Nucellus; the Embryo-sac; Unisexual (Monoecious) flowers; Dioecious flowers; Hermaphrodite flowers; Artificial crossing.

(*e*) THE STRUCTURE AND FUNCTIONS OF FRUITS. Carpets; Ovaries; Methods of formation of the principal economic fruits; factors affecting fruit-production; effects of Complete and Incomplete Fertilisation on Fruit; effects of Weather on Fruit-Formation and crop-development; Collection and Examination of wild fruits.

(*f*) THE STRUCTURE AND FUNCTIONS OF SEEDS. The Embryo and its development; Endosperm; Perisperm; Seed-coats; Cotyledons; Albuminous and Exalbuminous seeds; Seeds which are valuable as Food; Factors affecting the Germination of Seeds; The Longevity of Seeds; Testing; Water and Sand Cultures; Useful Tables; Collection and Examination of dry Seeds; Dispersal of Seeds in Nature.

III. PRINCIPLES OF SOIL STUDY

SPACE only permits of a brief indication of the lines of study which should be pursued with a view to obtaining a mastery of this important horticultural matter. The following outline may be adopted:

(*a*) SOURCES OF SOIL. Action of rain, wind, running water, frost, and volcanoes. Fracture by roots.

(*b*) FORMATION OF SOIL. Early layers of dead plants which needed no humus; successional layers of plants which needed a little humus; later layers of Heaths and Sedges, which needed much humus. On rock of dense formation, and holding much moisture, formation is rapid; on more open formations increase is slow. Further increase is due to cultivation, including tillage and manuring. Sedentary and drift soils. Alluvium.

(*c*) TYPES OF SOIL. Clay, Sand, Chalk, Peat, Mineral fragments. Strata of deep excavations examined. Samples of the different kinds of soil, and mixtures such as loam, examined. A mechanical analysis of soil made.

(*d*) WILD PLANTS COMMON TO PARTICULAR SOILS. Wild flowers noted as a clue to the character of the prevailing soil, as follows:

Clay	*Sand*	*Chalk*	*Peat*
Dock	Bindweed	Chicory	Heather
Coltsfoot	Catchfly	Valerian	Sorrel
Sow thistle	Spurrey	Campion	Azalea
Oak	Cornflower	Cow Parsnip	Sundew
		Birdsfoot Trefoil	

(*e*) AIR AND WATER IN THE SOIL. Composition of air; Air-pressure; Particles and interspaces of soil; Capillarity; Composition of water; Stagnancy; Effects of drainage; Use of rain-gauge.

(*f*) WEATHERING OF SOILS. Influences of Wind and Frost. Effects of cultural operations, such as Ridging and Rough digging; also Liming.

(*g*) SOURCES OF HEAT IN THE SOIL. Action of the sun; Manuring; Loss of heat through Radiation and Evaporation; Condensation; Dew

and Hoar Frost; Maximum and Minimum Thermometers; Barometer examined; Thermometer read; Graphs made; Records taken.

(*h*) LIFE IN THE SOIL. Bacteria; Nitrification. Plant-foods: Organic and Inorganic constituents.

(*i*) TILLAGE OF SOILS. Digging; Trenching and Bastard-trenching; Production of a fine tilth by subsequent forking and raking; hoes and hoeing.

IV. STUDY OF INSECTS

IN view of the vital part which insects play in the pursuit of horticulture, it is suggested that a study of some of the principal kinds should be made, under a definite system of classification, as follows:

(*a*) ARTHROPODA. Various; see below.
(*b*) NEMATOIDS. Eelworms.
(*c*) MOLLUSCS. Slugs and Snails.

Six sections of Arthropoda, namely:

(1) *Lepidoptera, four scaled wings:*

Winter Moth	Lackey Moth	
March Moth	Mottled Umber Moth	
Vapourer Moth	Codlin Moth	
Tortrix Moth	Figure-of-eight Moth	
Small Ermine Moth	Heart-and-dart Moth	Producing surface caterpillars.
Magpie Moth	Dart Moth	
Cabbage White Moth	Yellow Underwing Moth	

(2) *Diptera, two-winged flies:*

Carrot fly	Celery fly
Onion fly	Daddy-long-legs

(3) *Coleoptera, Beetles with 4 two-sheathed wings:*

Click beetle (wireworm)	Raspberry beetle
Gall weevil	Pea weevil
Flea beetle	Bean weevil
Apple-blossom weevil	Ladybird (beneficial)

(4) *Hymenoptera, four membranous wings:*

Wasps	Apple sawfly
Ants	Gooseberry sawfly

(5) *Hemiptera, incomplete wings:*

American blight (woolly aphis)	Mussel scale
Apple and other aphides	Bean dolphin
Sucker	Snowy fly

(6) *Thysanoptera, fringed wings:*

Thrips

The metamorphosis (egg, larva, chrysalis, imago) complete in Sections (1), (2), (3), (4); incomplete in Sections (5) and (6).

V. PRINCIPLES OF PLANT FOODS

It is suggested that as a preliminary to the study of Manures (see Manures in body of work under " M ") the following principles should be examined:

CHEMICAL COMPOSITION OF A PLANT:

(1) *Percentage of water.* 75-85.

(2) *Dry matter.* If dried in an oven and the water driven off as vapour an analysis shows:

Carbon	50
Hydrogen and Oxygen . .	45
Nitrogen	2
Various	3
	100

(3) *Chief constituents of ash.*

Phosphorus	Calcium	Silicon
Potash	Magnesium	Sodium
Sulphur	Iron	

(4) *Constituents of chief atmospheric gases by volume.*

Nitrogen	78·00
Oxygen	20·96
Argon	1.00
Carbon	0·04
	100·00

The foregoing are obtained by the plant through the following means:

(*a*) CARBON. Obtained from the air in the form of carbon dioxide (CO_2), and need not be considered in manures.

(*b*) HYDROGEN AND OXYGEN. Obtained from water and need not be considered in manures.

(*c*) NITROGEN, PHOSPHORUS, AND POTASH. Supplied through manures.

(*d*) SULPHUR, CALCIUM, MAGNESIUM, AND IRON. Generally present in sufficient quantities and need only be supplied through manures in special circumstances.

Nitrogen is converted into (*a*) ammonia, (*b*) nitrites, (*c*) nitrates by bacteria. Free nitrogen is fixed by bacteria in nodules in leguminous plants, e.g. Peas. Traces of nitric acid and ammonia in the atmosphere, especially after thunderstorms, are brought down in rain and deposited by dew. Ammonia is disengaged from decomposing bodies and absorbed by plants. Water in the atmosphere contains carbonic and nitric acids.

VI. THE PRINCIPAL PLANT ORDERS

Section 1. Dicotyledons

Order	*Representative Plants*
Boraginaceæ (Boragineæ)	Anchusa, Borage, Heliotrope, Forget-me-not, Pulmonaria
Campanulaceæ	Campanula, Lobelia
Caprifoliaceæ	Lonicera (Honeysuckle)
Caryophyllaceæ (Caryophylleæ)	Carnation, Gypsophila, Lychnis, Saponaria, Silene, Sweet William, Viscaria
Chenopodiaceæ	Beet, Spinach
Compositæ	Achillea, Aster, Marigold, Coreopsis, Centaurea, Chrysanthemum, Chicory, Cosmos, Dahlia, Daisy, Gaillardia, Sunflower, Sweet Sultan, Tagetes, Zinnia
Convolvulaceæ	Convolvulus
Crassulaceæ	Cotyledon, Crassula, Sedum, Sempervivum
Cruciferæ	Alyssum, Arabis, Aubrietia, Candytuft, Wallflower, Rocket, Honesty, Stock
Cucurbitaceæ	Cucumber, Gourd, Melon, Pumpkin, Vegetable Marrow
Dipsaceæ	Scabious
Ericaceæ	Heath
Euphorbiaceæ	Box, Castor-oil Plant
Geraniaceæ	Geranium, Balsam, Nasturtium, Oxalis, Pelargonium
Hydrophyllaceæ	Nemophila, Phacelia
Labiatæ	Lavender, Balm, Mint, Marjoram, Sage, Thyme
Leguminosæ	Bladder Senna, Coronilla, Galega, Broom, Laburnum, Sweet Pea, Lupins, Clover
Lineæ	Linum (Flax)
Loasaceæ	Bartonia
Malvaceæ	Hollyhock, Lavatera, Mallow
Myrtaceæ	Eucalyptus, Myrtle
Onagrariaceæ (Onagrarieæ)	Clarkia, Fuchsia, Godetia, Oenothera (Evening Primrose)
Papaveraceæ	Eschscholtzia, Poppy
Plumbaginaceæ (Plumbagineæ)	Thrift, Statice (Sea Lavender)
Polemoniaceæ	Gilia, Phlox, Polemonium
Polygonaceæ	Polygonum (Bistort, etc.), Rhubarb
Primulaceæ	Anagallis, Cyclamen, American Cowslip, Loosestrife, Primula (Cowslip, Polyanthus, and Primrose)
Ranunculaceæ	Adonis, Anemone, Aquilegia, Delphinium, Love-in-a-Mist, Ranunculus
Resedaceæ	Mignonette
Rosaceæ	Hawthorn, Geum, Potentilla, Prunus, including Cherry and Plum, Pyrus, including Apple and Pear, Raspberry, Rose, Spiraea, Strawberry

Order	*Representative Plants*
Saxifragaceæ (Saxifrageæ)	Hydrangea, Ribes, including Currant and Gooseberry, Saxifraga
Scrophulariaceæ (Scrophularineæ)	Antirrhinum, Calceolaria, Collinsia, Foxglove, Nemesia, Pentstemon, Mullein, Veronica
Solanaceæ	Datura, Nicotiana, Petunia, Winter Cherry, Potato, Salpiglossis, Tomato
Umbelliferæ	Carrot, Celery, Sea Holly, Parsley, Parsnip
Urticaceæ	Hemp
Violarieæ (Violaceæ)	Viola or Pansy

SECTION 2. MONOCOTYLEDONS

Amaryllidaceæ (Amaryllideæ)	Daffodil, Snowdrop
Gramineæ	Maize, Ornamental Grasses, Gynerium
Iridaceæ (Irideæ)	Crocus, Gladiolus, Iris, Ixia
Liliaceæ	Asparagus, Asphodel, Colchicum, Lily of the Valley, Dog's Tooth Violet, Fritillaria, Hyacinth, Kniphofia, Lilium, Garlic, Leek, Onion, Shallot
Orchidaceæ	Orchid, Orchis

VII. DIVISIONS OF GARDENS

IT is an aid to the convenient and economical management of a garden to consider it under various divisions, such as the following, all of which are included in the present encyclopaedia in alphabetical order:

(1) *Allotments.* Areas; lay-out; cropping methods; legal privileges.

(2) *Alpine Plants and Rock Gardens.* Sites; stones; selection of plants.

(3) *Annuals.* Value in gardens; cultivation; selection of kinds.

(4) *Beds and Bedding-out.* Forms of beds; suggestions for beautiful associations of plants; hardy plants; tender plants.

(5) *Bulbs.* Value for gardens, greenhouses, and rooms; cultivation in soil, fibre and water; selection of kinds.

(6) *Florists' Flowers.* Selection of kinds and varieties; cultivation.

(7) *Flower Gardens.* Sites; special features such as beds and borders; selection of plants.

(8) *Fruit Gardens and Orchards.* Sites; aspect; soil; propagating; pruning; spraying; selection of kinds and varieties.

(9) *Grass and Lawns.* Seeds; turf; kinds of grasses and clovers; weeds; mowing and rolling.

(10) *Greenhouses and Frames.* Types; aspect; heating; selection of plants.

(11) *Herbaceous Borders and Plants.* Sites; arrangement; colour-grouping; selection of plants.

(12) *Kitchen Gardens.* Sites; arrangement; paths; selection of crops.
(13) *Manures.* Natural manures; artificial manures; methods of application.
(14) *Shrubs and Trees.* Evergreen and deciduous; uses in gardens; selections for various purposes.
(15) *Soils.* Formation; drainage; tillage; mixtures to form composts for various plants.
(16) *Tools and Appliances.* Digging and trenching tools; tilth tools; rollers and mowers; pruning implements.
(17) *Vegetables.* Intensive culture; rotations; intercropping.
(18) *Walls and Fences.* Materials; aspects; selection of climbers and creepers.
(19) *Water and Watering.* Value of water; time and method of application; liquid manure.

LIST OF ILLUSTRATIONS

	PAGE
Aspleniums, propagating	488
Bastard-trenching	478
Bouvardias, cutting back and propagating	488
Box edging, dividing	490
Budding	475
Bulbs, growing in bowls	494
Caladiums, propagating	486
Camellias, propagating	486
Celery, blanching	482
Chrysanthemums, propagating	481
Cinerarias, seedling	493
Coleuses, stopping and propagating	488
Conifers, propagating	490
Currants, pruning red	474
Dracaenas, propagating	486
Eucharises, propagating	486
Figs, fruiting character of	476
Fruit trees:	
Pruning standard	472
Cordon	473
Fan	473
Grafting	475
Budding	475
Stocks	489
Labelling	489
Lorette pruning	495
Gall weevil	489
Geraniums, zonal:	
Planting	483
Propagating	483
Gladioli, increasing	490
Gooseberries, pruning	474
Grafting	475
Grape Vines:	
Propagating	477
Renovating	477
Thinning bunches of grapes	477
Hedges, planting	487
Heliotrope, propagating	493
Herbaceous plants:	
Dividing	485
Staking	485
Hydrangeas, propagating	481
Labelling fruit trees	489
Leeks, planting	482
Liliums, increasing by offsets	492
Lorette pruning	495
Melons:	
Stopping	476
Fruiting system	476
Oranges, grafting	493
Polyanthuses, dividing	491
Potatoes:	
Growing in pots	482
Disease	482
Pruning. See Fruit and Roses	
Raspberries, training	476
Rhubarb, forcing	482
Rock plants:	
In steps	487
For walls	494
Roses:	
Pruning dwarf	479
Pruning rambler	491
Budding dwarf	491
Striking cuttings	491
Salvias, propagating	486
Seedlings, raising under glass	480
Smilax, training	492
Soil, deepening and enriching	478
Strawberries:	
Good and bad planting	471
Propagating	471
Thinning bloom	471
Sweet Peas:	
Growing in trenches	478
Staking	492
Trenching	478
Vines. See Grape Vines	
Violets, propagating	485
Walks, draining	487
Wall Gardening	494
Wasps, trapping	489
Water Lilies, growing in tanks, pools, and ponds	484
Yuccas, propagating	486

A

Aaron's Beard. See Saxifraga sarmentosa and Hypericum (St. John's Wort).

Aaron's Rod. A popular name for the Great Mullein, Verbascum Thapsus.

Abele Tree (a-bēle), the White Poplar, Populus alba. See Poplar.

Abelia (a-bē-lia. Ord. Caprifoliaceæ). Greenhouse shrubs which are sometimes grown outside in mild districts. Propagation is by layers in spring and by cuttings under a bell-glass in summer. Loam and peat, with sand, suit. Floribunda, a spring bloomer with rosy purple flowers 3 ft. high, is the most popular species. Three interesting modern Chinese species are Graebneriana, pink tubular flowers; grandiflora, white tinted pink; and Schumannii, lilac-rose; all 4 ft. high.

Abies, Spruce Firs (ā-biēs. Ord. Coniferæ). The Abies are closely connected with the Piceas, but have upright instead of drooping cones, and flat, soft leaves instead of round, hard ones. They are evergreens. There is considerable confusion in the nomenclature of the Spruce Firs, botanists and nurserymen using different names. Several important species still called Abies by traders are now referred to other genera by botanists, notably Albertiana, now Tsuga Mertensiana; Douglasii, now Pseudotsuga Douglasii; excelsa, now Picea Morinda; and Smithiana, now Picea Morinda. The most important species kept under Abies by botanists are balsamea, the Balm of Gilead; cephalonica, concolor (lasiocarpa), grandis, nobilis, Nordmanniana, pectinata (Silver Fir) and Pinsapo. These are all good Conifers, suitable for selected positions in the garden, as on large lawns, and make handsome trees in deep, fertile soil. If the natural soil is poor the young trees ought to be given a start with a barrowload of loam each, preferably in the form of turves. Plant in autumn or winter. See also Picea, Pseudotsuga, and Tsuga.

Abobra (ā-bŏb-ra. Ord. Cucurbitaceæ). The only species grown is viridiflora; a dioecious climbing perennial with greenish fragrant flowers in summer, which may be followed by scarlet fruits if male and female plants are grown together. Greenhouse or garden arbours in summer. Propagate like Dahlias.

Abronia (ā-brō-nia. Ord. Nyctaginæ). A small genus of perennial trailing plants, suitable for rockeries. They like sandy soil, and are commonly known as Sand Verbenas. Cuttings strike in sandy soil in spring under glass. A stock can be raised in the first place from seed, which may be sown in a frame in autumn. Arenaria, yellow, July; and fragrans, white, May, are procurable. Both are sweet. Umbellata, pink flowers in Heliotrope-like heads, sweet, a trailer flowering in spring and summer, is very attractive.

Abrus (ā-brus. Ord. Leguminosæ). The species precatorius is a

warm-house climber, with purple flowers, and is of interest on account of the pretty scarlet and white seeds, which are used for rosaries. Sow in heat. Loam with some leafmould and sand suits.

Absorption. The taking-in by the root-hairs of plants of soil-water with salts in solution. The hairs give out an acid secretion.

Abutilon (ă-bū-tilon. Ord. Malvaceæ). Greenhouse plants, sometimes grown in pots, but often planted out, and allowed to run up rafters, walls, or pillars. They produce large evergreen leaves, and bright, drooping, bell-shaped flowers. With the exception of Thomsonii, which is often mixed with flowering plants in the garden for the beauty of its mottled leaves; megapotamicum (vexillarium), which also has handsome foliage and scarlet and yellow flowers; and insigne, white flowers streaked carmine, the species have been discarded in favour of modern varieties.

Propagation. By cuttings and seeds. The former, pieces of young, flowerless wood with the lower leaves removed, may be inserted, and the latter sown, in sandy soil in gentle bottom heat in spring.

Compost. Sandy loam with a third of peat.

Stopping. Pinch out the tips first, soon after the cuttings have rooted, and subsequently when the resulting shoots have extended a few inches. This will make them form side shoots.

Potting. If to be grown in pots give successive shifts as the pots get filled with roots, say from 3 to 6 inch and from 6 to 8½ inch. Provide a light position.

Water and Heat. They love water, both at the roots and over the foliage throughout the summer, but not much will be required in autumn and winter. The winter temperature may be 45°.

Abyssinian Primrose. See Primula verticillata.

Acacia (ă-cā-cia. Ord. Leguminosæ). Most of these beautiful rambling shrubs have yellow, primrose, or white flowers in the form of small globes or cones, with feathery leaves; but a few have flat foliage. The well-known " mimosa " of the florists' shops is Acacia dealbata, otherwise known as the Silver Wattle.

Select Species. Armata, yellow; Drummondii, lemon, pretty foliage; leprosa, primrose, charming against a pillar with the flowering shoots drooping; pulchella, deep yellow, one of the smallest growers; Riceana, yellow, graceful, dependent habit; and verticillata, yellow, cone-shaped, all flower in spring, and thrive in the greenhouse, growing 6 to 15 ft. high. Lophantha (Albizzia lophantha), pale yellow, 6 ft., was once a favourite for subtropical gardening and was raised from seed.

Propagation. The tips of the shoots should be taken as cuttings a few weeks after flowering, when they are fairly well matured, inserted in sandy soil, and covered with a bell-glass.

Compost. Fibrous loam, lightened with sand. One-third of leafmould is an advantage. The soil should be made firm at each repotting, if they are grown in pots, but they are often planted out.

Pruning. If straggly, prune hard after flowering, and new growth will break from the old wood, especially if they are well syringed.

Water and Heat. A good deal of water is needed in summer. Winter temperature for all the species named, 45°.

Acacia Tree. See Robinia.

Acaena (a-sē-na. Ord. Rosaceæ). The most popular species is microphylla, a creeping evergreen suitable for rockwork, the flowers with crimson spines. Ordinary soil. Propagated by seeds, cuttings, or division in spring.

Acalypha (ă-căl-ỹpha. Ord. Euphorbiaceæ). Stove shrubs, principally grown for their handsome leaves, but hispida (Sanderiana) has crimson spikes of bloom in summer. Macafeeana and musaica have marbled foliage. Propagation is by cuttings in a propagator in spring or summer. Equal parts of loam and leaf-soil, with sand, suit.

Acantholimon (a-can-thō-lī-mon. Ord. Plumbagineæ). Glumaceum (Statice Ararati), which produces masses of pointed leaves and pink flowers in summer, 6 ins. high, is used for the rockery. Sandy soil. Propagation is by seeds in spring in a frame, or cuttings in August, using sandy soil in a frame in both cases.

Acanthopanax (a - can - thō - pā - nax. Ord. Araliaceæ). Aralia-like shrubs, grown for their handsome foliage, requiring rich soil and a sunny sheltered site. Propagation is by seeds or root cuttings. Ricinifolium, sessiliflorum, and spinosum are the best species, and all are suitable for subtropical gardening, growing several feet high. There is a variegated form of spinosum.

Acanthus (a - căn - thus. Ord. Acanthaceæ). Herbaceous plants, generally represented by the species mollis (whose leaves suggested the Corinthian style of architecture), although lusitanicus (latifolius) is finer. They grow about 4 ft. high, and have white or pink flowers in summer, but are chiefly remarkable for their handsome foliage. Montanus, white spikes of bloom 3 ft. long, is good. Propagation is by seed sown in a warm greenhouse or frame in spring. Subsequent increase may be by division. Plant out in rich soil.

Acer, Maple (ā-ser. Ord. Sapindaceæ). An important genus of trees, embracing the Common, Silver, Japanese, Norway, and Scarlet Maples, as well as the Sycamore. There is also the variegated Negundo, which, although not quite hardy, survives the winter in most districts if it has partial shelter.

Select Species. Campestre, the common Maple, with small divided leaves; there are varieties with gold and silver margins; dasycarpum, the Silver Maple; japonicum, several varieties; Negundo variegata, with green and white foliage, a small tree; palmatum, the Japanese Maple, many varieties; platanoides, the Norway Maple, many varieties; Pseudoplatanus, the Sycamore, many varieties; and rubrum, the Scarlet Maple, with heart-shaped leaves. Of more modern species, Forrestii, the bark streaked with red; and griseum, with cinnamon-coloured peeling bark, may be mentioned.

Hardiness. The varieties of the Japanese Maple, and Negundo variegata, are well adapted for small gardens, as they give welcome colour and beauty of form if places exposed to cold winds or hard frosts in spring are avoided. The Sycamore is perfectly hardy, and being cheap, as well as a rapid grower, and thriving on chalk, is very useful.

Propagation. By layers or seeds, the choicer varieties also by grafts and buds, but the small planter will buy young trees from nurserymen.

Soil. A stiff, damp soil is not suitable for the majority, which prefer well-drained loam, but the Scarlet Maple will thrive in wet soil.

Achene. A dry, dehiscent fruit with 1 carpel, such as the " seeds " on the surface of Strawberries.

Achillea, Milfoil, Yarrow (ăk-ill-ē-a. Ord. Compositæ). Pretty hardy plants, mostly suitable for bŏrders. Ageratum, yellow flowers in summer, 2 ft., is the Sweet Maudlin. Clavennae, which has hoary leaves, and bears white flowers in spring; rupestris, silvery leaves, white; tomentosa, which has woolly leaves and produces yellow flowers in summer; and umbellata, silvery leaves and white flowers in June, 6 ins., are good for the rockery, as they only grow from 6 ins. to 1 ft. high. Sericea, 1 ft., May, white, is also pretty on the rockery. Of the taller border kinds, Millefolium roseum, the red Milfoil, or Yarrow, 2 ft. high, a summer bloomer; and Ptarmica The Pearl, 2 ft. high, with double white flowers, are the best known. Propagation is by division of the roots in autumn or spring, or by seeds if preferred. They are not at all particular as to soil, and will thrive in stiff, cool ground.

Achimenes (akki-mē-nēs. Ord. Gesneraceæ). Showy plants, forming tubercles at the root, to which the plants die back in autumn, and from which they start again the following spring. They are particularly suitable for hanging baskets. Sandy loam, with a little decayed manure or leafmould, kept in the basket by a lining of moss, suits. Tubercles may be bought and started into growth in pans or boxes in a warm house or frame in winter, and potted or put 3 ins. apart round the baskets when they are 3 ins. high. The plants like a moist atmosphere and plenty of water while in growth. When in full bloom they may be hung in a cool house. There are numerous species, but the varieties obtainable from bulb-dealers (generally in mixture) are more popular.

Acids. The principal acids in plants are citric, malic, oxalic, and tartaric, but more than 200 kinds have been found See a modern work on plant-chemistry.

Acis (ā-cis. Ord. Amaryllideæ). Closely allied to the Snowflakes (see Leucojum). The principal species is autumnale, white, tinged rose, growing about 6 ins. high, and blooming in summer. It does best in sandy peat on the rockery.

Aconite, Winter (Eranthis hyemalis). A pretty, low, winter-blooming plant with a green frill round the pale yellow flowers, and palmate leaves. A broad clump in full bloom makes an enlivening picture in the garden on a winter day. Any friable garden soil suits. The roots are tuberous, and may be obtained from seedsmen and planted in a cool shady place early in autumn, to flower in the New Year, or thereabouts. Increase may be effected by division after flowering.

Aconitum, Monkshood, Wolf's-bane (akkon-ī-tum. Ord. Ranunculaceæ). The common Monkshood is one of the most poisonous, yet most handsome, of hardy plants. The root has been mistaken for Horseradish, and eaten, with fatal results. Some people exclude it from their gardens on account of its poisonous properties, but that ought not to be necessary. Napellus, blue, helmet-shaped flowers in summer, height 4 ft., is the type; there is a white variety, also a handsome blue and white called bicolor. Other fine species are Anthora, 2 ft. high, yellow; Fischeri, 2 ft., deep blue, late bloomer; Wilsoni, 4 ft., pale blue; and Lycoctonum, 4 ft., yellow. Propagation is by

division in spring; in view of the poisonous nature of the roots it should be done by some responsible person, who may be trusted to avoid leaving portions of root about. A cool, substantial soil, such as suits Dahlias, Sweet Peas, and Roses, will grow Monkshoods to perfection. They enjoy a shaded position.

Acorus (ăk-or-us. Ord. Aroideæ). The species Calamus is the Sweet Flag of British marshes, with yellow flowers, sword-shaped leaves, and fragrant roots. It may be grown in gardens by the waterside. Propagation is by division in spring.

Acroclinium (ak-rok-lĭn-ium. Ord. Compositæ). The pretty half-hardy annual sold by seedsmen under the name Acroclinium roseum is called Helipterum roseum by botanists. With its white variety, it makes a charming pot plant if sown under glass in spring and several plants set in a 5-in. pot. The flowers last several months if gathered young and hung head downwards in a cool place.

Actaea (ăc-tae-a. Ord. Ranunculaceæ). The species spicata is the common British Baneberry, with white flowers and black poisonous fruits. It is sometimes grown in cool shady borders.

Actinella (ac-tin-ell-a. Ord. Compositæ). A small genus of hardy herbaceous plants, useful for the rock garden, but not in general cultivation. Grandiflorum, with yellow flowers in summer, 1 ft. high; and scaposa, yellow, 1 ft., narrow downy leaves, are the best. A sunny position and friable loamy soil suit them. Propagation is by division in spring.

Actinidia (ac-tin-ĭd-ia. Ord. Ternstroemiaceæ). Climbing shrubs, so nearly hardy as to succeed outdoors in mild districts or sheltered places, liking well-drained loam. Kolomikta and polygama, both with white flowers in summer, are the best known. Chinensis, with creamy flowers and Gooseberry-like fruits, is newer. Propagation is by layering in autumn.

Adam's Needle. See Yucca.

Adder's Tongue. See Ophioglossum.

Adenophora, Gland Bellflower (ad-en-ŏph-ora. Ord. Campanulaceæ), Pretty, Campanula-like, herbaceous perennials with fleshy roots and blue flowers, suitable for the border, where they thrive in friable loamy soil. Of the several species, latifolia, 4 ft., August bloomer, is perhaps the best known. Potaninii, 2½ ft., is also worth mentioning. Propagation is by seeds in a frame in spring, planting out later for flowering the following year.

Adiantum, Maidenhair (addy-an-tum. Ord. Filices). Beautiful and popular ferns, nearly all requiring greenhouse or stove treatment. There are numerous species, and a still larger number of varieties. The following are the principal: Capillus-Veneris, the British Maidenhair, which, although not generally hardy, grows wild in Cornwall, imbricatum is a beautiful variety of it; caudatum, stove; concinnum, good for baskets, a stove species which has a charming variety called latum; cuneatum, the popular Maidenhair, so greatly esteemed as a table plant and for association with cut flowers, gracillimum, grandiceps, and Pacotti are pretty varieties of it, it likes a warm greenhouse; farleyense, broad, tinted fronds, stove; macrophyllum, a large stove species; and pedatum, hardy.

Propagation. By spores and division. Sow in a propagating case, or in heat, and cover with a bell-glass. But cuneatum is easily

propagated by splitting it up; and farleyense, which does not produce spores, is exclusively increased in this way.

Compost. 2 parts loam, 1 each peat and leafmould, and ½ part sand. In the main the plants must have shade, but it should not be dense; a soft, diffused light is best.

Room Culture. When cuneatum has become rusty through being used in rooms, it should be cut right down, in fact, many growers make autumn pruning an annual function. It may be kept fresh in a living-room for several months if great care is taken in watering, and, while giving it air, preserving it from cold draughts. All ferns like moisture, but the soil should not be kept sodden.

For Cut Flowers. When fronds of Maidenhair are to be associated with flowers they should be cut and laid in water for a few hours before being used, then they last better.

Adlumia cirrhosa (ad-lū-mia. Ord. Papaveraceæ). A North American biennial rambler with Fern-like foliage and pale pink or white flowers in August. The seed may be sown in autumn if there is frame accommodation, the plants being put out from the boxes in spring, to flower the same year as planted; or the seed may be sown outside in late spring for the plants to climb and bloom the following year. Ordinary garden soil.

Adonis (a-dō-nis. Ord. Ranunculaceæ). The well-known "Ox-eye," vernalis, is a brilliant perennial with Fennel-like foliage and yellow flowers in spring, height about 18 ins. It is a desirable plant for the border or rockery, particularly in a sheltered position, propagated by seeds and division. Amurensis, a Chinese species, resembles it, but flowers earlier; the double form of this, yellow with green centre, is handsome. Autumnalis, the native crimson Pheasant's-eye, or Red Morocco, is an annual, as is aestivalis. Sow outside in spring.

Adventitious Roots. Those arising from other parts than the radicle (see Radicle), such as the stem roots of Lilium.

Aerides (ā-ĕr-i-dēs. Ord. Orchidaceæ). Evergreen Orchids, with flowers in racemes. Fieldingii, which bears white, rose, and brown flowers in late spring, and grows about 3 ft. high, is the principal species. The Aerides require a warm, moist house. They may be planted in pans or baskets in crocks and Sphagnum moss. The spring and summer temperature, when the plants are growing, may range from 75° to 85°, but in autumn and winter 10° less will suffice. Abundance of water will be required throughout the growing period, both at the roots and in the air, but the supply must be reduced in winter.

Æsculus, Horse Chestnut (ĕs-cu-lus. Ord. Sapindaceæ). The Horse Chestnut, Æsculus Hippocastanum, is a well-known British tree, handsome in form and foliage, and very beautiful when in bloom. There are several varieties, including a double with pink and white flowers, and one with variegated leaves. Parviflora (Pavia californica) is a handsome dwarf species, which produces white flowers in spring. Propagation is by seeds for the common, and by grafting for the choicer varieties, but the private planter should buy small transplanted trees in autumn, winter, or spring, and plant and stake firmly. Rich, moist loam is best, but the tree will attain to fair dimensions in most kinds of soil if not poor and dry. It thrives on clay.

Aestivation. In botany, the arrangement of petals in the bud stage of a flower.

Æthionema (ēthion-ē-ma. Ord. Cruciferæ). The most popular species is grandiflorum, a perennial, with glaucous leaves and rosy flowers in spring and summer, height 1 ft., a good rockery plant. Buxbaumi (cappadocicum), red, June, 6 ins.; and saxatile, soft rose, 6 ins., are annuals. Propagation is by seeds in spring for the annuals and by seeds and cuttings for the perennials.

African Lily. See Agapanthus.

African Marigold. See Marigold.

Agapanthus, African Lily (ag-a-pan-thus. Ord. Liliaceæ). The only species is umbellatus, but there are several varieties of it. Most of them are blue, but there are also whites, a form with silvery leaf-margins, and a double. It is a beautiful Cape plant with long sword-shaped, light green leaves, and blue flowers borne in an umbel on a stout stem about 3 ft. high. It is not perfectly hardy, but is found to pass the winter outdoors in mild districts when planted near water. More often, when used for outdoor effect, it is grown in a large tub or pot, so that it can be stood in appropriate positions, such as at the top of flights of steps, and moved indoors for the winter. It is often grown in tubs for the adornment of large conservatories. Propagation is by division in spring. Three parts loam, 1 decayed manure, 1 leafmould, and ½ sand, well mixed and made firm, suit for compost.

Agaricus campestris. See Mushroom.

Agathaea (ag-a-thē-a. Ord. Compositæ). The species coelestis, the so-called Blue Marguerite, with blue flowers in early summer, height 2 ft., is an attractive greenhouse plant, but is little grown nowadays. Marguerite or Cineraria treatment suits it. See Marguerite.

Agave (ăg-a-vē. Ord. Amaryllideæ). Very handsome greenhouse plants, with fleshy, spiny leaves, and greenish-yellow, funnel-shaped flowers. They are slow growers, and bloom rarely. A tradition has grown up out of the latter fact that they flower every 100 years, but it is an error. The principal species is americana, which is so nearly hardy that it is made use of for the garden, often being grown in large tubs and stood in prominent positions, but it will not survive the winter in cold districts. There are several varieties of it, notably picta and variegata, which have variegated leaves. Filamentosa has leaves the margins of which are furnished with long threads. Sartori is a dwarf grower and a comparatively free bloomer.

Propagation. By suckers, which form at the base of the plant, and may be pulled off and potted.

Compost. 3 parts loam, 1 dried cow manure, 1 leafmould, ¼ part sand, made quite firm.

Watering. They will take a good deal of water in summer, but the supply must be reduced in autumn, and very little given in winter.

Ageratum (aj-er-ā-tum. Ord. Compositæ). Pretty dwarf plants, generally treated as annuals, being raised from seed in spring, and thrown away after seeding in autumn. The fading flowers may be pinched off to prevent seed-formation if desired, and the plants preserved through the winter in a cool house, to be subsequently increased by cuttings, which may be inserted either in autumn or spring. This plan may be adopted in order to make quite sure of keeping a variety true, but as a rule they come pretty true from seed.

Where seedlings are preferred, the seed may be sown in a greenhouse or heated frame in spring, and the seedlings hardened and planted out as margins to borders, or in mixed beds. Any friable, well-drained soil will do; the plants do not like a stiff, wet, adhesive soil. Mexicanum, pale blue, 1 ft., is the best-known species, but modern varieties are generally preferred. See florists' specialities.

Agrostemma (ăgros-tem-ma. Ord. Caryophylleæ). The plants sold by seedsmen as Agrostemmas, namely Coeli-rosea (Rose of Heaven), and coronaria (Rose Campion), are classed with Lychnises by botanists. The former is an annual with rose flowers, height 1 ft. The latter is a perennial with crimson flowers and woolly leaves, height 2 ft. Both will thrive in ordinary garden soil, and may be raised from seed in spring. There are several varieties of each species.

Agrostis, Bent Grass (ă-grŏs-tis. Ord. Gramineæ). The two most useful garden species are nebulosa (Cloud Grass), 18 ins., and pulchella, 15 ins. Both are annuals, suitable for sowing outdoors in spring or September. They are often gathered for winter decorations.

Ailanthus, Tree of Heaven (ail-an-thus. Ord. Simarubeæ). Ailanthus (or Ailantus) glandulosus is a handsome small tree which may be regarded as hardy, although liable to injury if exposed to cold winds. It loses its leaves in autumn. At Kew the plan is adopted of growing young plants in rich soil, and cutting them back close to the ground in autumn. In the following spring the best of the shoots which start is selected, and grown on to produce beautiful leaves in due course. Deep soil with plenty of manure is desirable.

Ajuga, Bugle (a-jū-ga. Ord. Labiatæ). Reptans, a blue-flowered species of creeping habit, blooming in summer, is used for the rockery. The form purpurea variegata, green and white leaves, blue flowers, is charming. Ordinary soil. Propagation is by division in spring.

Akebia (ă-kē-bia. Ord. Berberideæ). A semi-hardy climber, with pinkish lilac-scented flowers in spring. Loam, peat, and sand suit. Propagation is by cuttings inserted in sandy soil under a bell-glass in summer. It is grown on arbours outdoors in mild districts.

Albumens. Plant-substances containing carbohydrates, nitrogen and sulphur. Albumin, casein and fibrin are vegetable albumens. Albuminous matter is present in most seeds to sustain the young plant until roots begin to operate. See a modern work on plant-chemistry.

Alburnum. The sap-wood of trees.

Alder (Alnus glutinosa. Ord. Cupulifereæ). A well-known tree, not in great demand for parks and gardens, but esteemed because of its adaptability for damp positions. It will thrive in swampy places. It may be pruned annually, and made to do duty as covert. There are several distinct varieties of it, and of these aurea, with yellow foliage, is one of the best known.

Aletris. See Veltheimia.

Alexandrian Laurel. See Ruscus.

Algae. Simple plants, generally green and living in water or on stones. Red Algae exist, however, and give the Red Sea its colour. A green alga was probably the first definite stage of plant-life.

Alisma, Water Plantain (ă-lĭs-ma. Ord. Alismaceæ). The native species Plantago is a graceful plant with lance-shaped leaves and pink flowers in summer, height 2 ft. It is worth growing by the waterside in gardens.

Alkanet. See Anchusa.

Allamanda (alla-man-da. Ord. Apocynaceæ). Beautiful stove plants, which produce large, trumpet-shaped flowers freely during summer. All the principal species — and among these Hendersoni is the best known—have yellow flowers. Their growth is so vigorous that they may be used as climbers, being trained along the rafters; or they may be trained on balloon-shaped trellises in large pots. Propagation is by cuttings in spring, formed of the ends of partially matured shoots, inserted in sandy soil, and placed in a propagating case. 4 parts loam, 1 each decayed manure and leafmould, and ¼ sand, suit for compost. A good deal of water is needed when growing in summer, but the supply must be reduced in autumn. The plants may be pruned hard in late winter, and repotted; they will then start into growth vigorously.

All-Heal. See Valeriana.

Allium (ăl-ium. Ord. Liliaceæ). For certain useful food plants of this genus see Onion, Leek, Shallot, etc. Moly, with yellow flowers in June, 1 ft. high, and neapolitanum, white, 1½ ft., are garden favourites. Beesianum is a modern Chinese species with drooping blue flowers, hardy, suitable for a sunny rockery. Ordinary soil. Propagation by division.

Allotments. Small pieces of land, suitable for culture by working men, of special benefit in districts, whether urban or rural, where the gardens attached to the dwellings are small, or unsuitable for cropping. Flowers, fruit, and vegetables can all be grown on allotments, and in some cases pigs and poultry are kept, not always wisely. In view of the fact that the plots are generally held on a yearly tenancy, it is not the rule for holders to go to much expense for buildings or fittings. Large structures which might keep the sun from other plots should not be permitted.

Obtaining Land. Land for allotments can generally be obtained without serious difficulty in the country, but in case of trouble Parish Councils have the power of acquiring land for the purpose. It is desirable that the ground be reasonably near the cottages, and that it be fair agricultural land. In the Act of 1922 an allotment was defined as an area not exceeding 40 rods, cultivated mainly to yield produce for home consumption. In certain circumstances, an allottee is entitled to compensation under the Act referred to if he is evicted.

Areas. The pieces should be cut up into parallel rectangular strips. Twenty square rods, poles, or perches (equal to an eighth of an acre) constitute a good average size, but it may vary according to circumstances. It is often more convenient to make smaller plots. Much larger ones are best avoided, as a man who is following a regular occupation throughout the day can hardly keep more than 20 rods clean and well cropped. Most of the County Councils give instruction in allotment cultivation through their staffs.

Soil and Manure. Deep culture and correct manuring are advised. The soil should be double dug (see Bastard trenching), and manured (see Manures.) Except in particular circumstances, vegetables should have most of the space.

Crops. The principal crops are Potatoes, Winter Greens (Broccoli, Brussels Sprouts, Kale, and Savoys), Onions, Cabbages, Beetroot,

Carrots, Parsnips, Cauliflowers, Celery, Tomatoes, Peas, Beans, Turnips, Leeks, Vegetable Marrows, and Rhubarb. Artichokes, Spinach, Shallots, Cucumbers, Horseradish, Salads (Lettuces, Radishes, etc.), and Herbs (Mint, Sage, Thyme, and so forth) may also be grown if desired.

Rotation Cropping. It is a good plan to arrange the crops in rotations. This is not easy on very small plots, where it is necessary to give up nearly half the ground to Potatoes, but it is not altogether impossible. In the first place, the vegetables might be thrown into three groups: (1) Potatoes and Winter Greens (the latter to be planted between or after early Potatoes in summer); (2) Peas, Beans, Turnips, Celery, Leeks, Spinach, and Onions (the Turnips and Spinach going between the Peas and Beans, the Leeks and Celery following the early Peas in summer); (3) Beet, Carrots, Parsnips, and Tomatoes. The following year Sections 2 and 3, taken together, may change places with Section 1. The third year Section 2 may occupy the ground which Section 3 had the first year, and Section 3 that of Section 2, Section 1 going back to its original place. The principal crops not provided for may be arranged as follows: Cabbages for spring may be raised early in August and planted in October on ground cleared of Onions. Cauliflowers for autumn may be sown in spring and planted in summer after early Peas or Potatoes. Rhubarb, Artichokes, and Herbs may have a permanent place at one end of the plot. Vegetable Marrows and Cucumbers may be raised in pots or boxes, and planted out in summer between early Peas or Cabbages, to succeed them. Lettuces may be grown on Celery ridges or between Peas. The various kinds are all dealt with under their own names in this work. See also Vegetables.

Fruit. It is not, as a rule, wise to plant much fruit on small allotments, and in any case the trees should not be mixed up indiscriminately with the vegetables. If planted, they should either form a group at one end, or else be planted in straight lines at intervals of about 20 ft. across the plot. Gooseberries, Currants, Raspberries, and bush Apples on the Paradise stock, are the most suitable. A bed of Strawberries may be provided if space permits. Flowers, such as annuals, may be grown in a border alongside the main path.

Weeds. Weeds should never be tolerated on allotments, as apart from robbing the soil they may, if they seed, prove a source of injury to other allottees than the man on whose ground they are permitted to grow.

The paths should be kept neat and clean.

Allspice. See Calycanthus.

Almond. The Almond (Prunus Amygdalus) is one of the most useful of flowering trees, because it blooms so early in spring. In mild districts it may be out in March, and it is rarely later than April, except in very cold parts. The pale pink flowers cover the long branches from tip to base, so that the tree makes a very cheerful object. There are several varieties of the common Almond. Dulcis is the Sweet Almond, and Amara the Bitter Almond. The dwarf Almond, Prunus nana, rose, 2–3 ft. high, is ornamental. Propagation need hardly be considered, because those who want trees will purchase the necessary number, probably in autumn. The Almond is not fastidious as to soil, and will grow almost anywhere if not dry.

It is a common object in the suburbs of London and other large towns.

Alnus. See Alder.

Aloe (al-ō-ē, commonly ā-loe. Ord. Liliaceæ). The Aloes often excite astonishment when planted out in public parks. The flowers may be 20 or 30 ft. above the ground. The plants are used in sub-tropical gardens in summer, and put under cover in winter, for they are not hardy. Several species are suitable for cultivation in greenhouses, notably striata, with spotted leaves; succotrina, with a rosette of glaucous leaves; and variegata, the popular variegated Aloe. Equal parts of loam and peat, with a quarter of shattered brick, suit. Propagation is by suckers. A temperature of about 45° will be suitable in winter, when very little water must be given.

Alonsoa (al-on-sō-a. Ord. Scrophularineæ). A genus of graceful greenhouse plants, including several which may be treated as annuals, being sown under glass in a warm house or frame in winter, pricked off and potted singly. Linifolia, 18 ins., Warscewiczii, 18 ins., and Warscewiczii compacta, 1 ft., all with scarlet flowers, may be treated in this way. Sandy loam suits them. They are occasionally used in flower beds, being sown outside where they are to flower; or better, raised under glass and planted out in May.

Aloysia citriodora. The same as Lippia citriodora (Lemon-scented Verbena), which see. Verbena triphylla is a third name for this plant of the perfumed leaves.

Alpine. A general term used to indicate plants which inhabit high mountains and in gardens are adapted to rockeries.

ALPINE GARDEN AND PLANTS

The cultivation of Alpine flowers may be considered under (*a*) Cultivation, and (*b*) Useful tables of Plants.

The modern garden is sometimes overdone with rock gardens, but never with Alpine flowers. Too often, indeed, people make rockeries which cannot be furnished adequately. It is waste of energy to erect a rockery the construction of which excludes plants. All gardens may have their collections of Alpines with but a small expenditure on stones if slopes and mounds and hillocks are taken full advantage of. True, a start can be made from the level, but in such a case considerable movements of soil are called for in order to secure the necessary elevation.

(*a*) *CULTIVATION*

Stones. When the question of economical gardening is under consideration, it should always be remembered that in rock gardening it is the stones which cost, especially in respect to labour. The plants can be raised, in the cases of many at least, from seed, so that the first cost is small; while as to weight, the most delicate woman can handle them with ease. Stones, however, are not only expensive but heavy. Even small stones involve a certain amount of muscular exertion in the moving and the fixing. Large ones demand strong men. The moral is obvious—we must consider the plants as the essential thing, not the stones.

Banks and Slopes. There are and always have been two classes of growers of Alpines: the one interested in rock gardens as gardens and aiming at imitating natural rockwork, the other caring chiefly for the plants as plants. The latter at least will listen sympathetically to suggestions of economising in stones. They will not mind how few they use so long as the plants thrive among them. Instead of going to the expense of building up a rock garden from the level, with all its obligations of earth moving and hoisting of large stones, they will very gladly utilise banks and slopes, placing medium-sized stones in tiers. The writer has made very satisfying rock gardens by taking advantage of slopes, some under grass that were difficult to mow. The working stages are in the main as follows: (1) strip off and remove the turf; (2) dig over the soil and shape it into flattish stages, and wide steps; (3) set the principal stones in position, taking care to give them a bed on which they can lie firmly; between the larger flat stones set smaller stones on end; (4) pack in the loose soil so that both flat and upright stones are held perfectly firm. In brief, the arrangement is that of a series of terraces, with the stones alternately flat and vertical to prevent stiffness and provide pockets. This plan has several advantages: it economises stones, it reduces labour, it obviates much shifting of soil, it has a simple and natural effect, it provides suitable homes for the plants. The aspect should be south or west. Whether looking down from the top of the bank or up from the bottom the flower-lover has a pleasing view. Always provided that the main stones are set quite firmly, he can walk up and down and laterally along the rockery with safety and ease. As a rule there should be little peppering in of small stones, although limestone and granite chippings may be freely used for surfacing among plants which benefit by them. There is not likely to be any stiffness, because, apart from the graduated outline of the slope, and the varied arrangement of the stones, plants of different habit can be associated on the terraces. In the case of a precipitous slope, stones may be embedded in order to provide a congenial foundation for such things as Arabises, Aubrietias, and Iberises, which will spread into broad masses and depend in showers of vivid blossom. Many a steep bank which is now ugly could be made beautiful in this inexpensive way.

Groups and Pockets. Natural mounds exist in many gardens and with a little management they could be made into pretty rock beds without much labour or expense. The turf should be stripped off, the soil well cultivated and stones laid to form either terraces or pockets or both. It is not necessary, as some suppose, to scheme the whole area of a rock garden into small pockets, although pockets are desirable for certain choice plants. As a matter of fact, charming rockeries can be made without any pockets at all. Without pockets pretty groups can be formed, clumps of a dozen or more plants being put together. It is especially when the flower lover wants to group favourite plants that the terrace system comes into its own. One might almost say that he makes a bed on a sloping surface, but it is not a bed with an even outline, and it is broken into a pleasing irregularity with the stones.

Suburban Gardens. Alpine plants could be grown on these lines

in many suburban gardens provided the sites of the slopes and mounds were open and sunny. Unfortunately, many suburban gardens are very damp in winter, owing to the play of the wind being checked by masses of surrounding buildings. This presents a condition inimical to the plants, which die off at an alarming rate, even in mild winters. In a sense mildness is bad, because increasing the already excessive damp. Where the difficulty cannot be overcome other plants should be grown, particularly bulbs, which generally thrive in damp places. But there are certainly suburban gardens which are open enough to be free from excessive damp in winter and in these Alpines could be grown. And there are gardens one portion of which would be unsuitable, because much shut in by large objects, while another would be suitable, because open alike to sun and wind. The effects of damp and stagnant air are indeed remarkable, even such a plant as the Mouse-ear Chickweed (Cerastium), which has such a power of root-extension and penetration as to make it in some places an unmitigated nuisance, dying out in others. People who argue that Alpines ought to be able to endure damp because they are often covered with snow for long spells in their native habitat forget that the snow is dry and that the atmosphere is also keen and dry.

Alpine Plants under Glass. There may come a time when people who can afford to build glasshouses will provide structures in which they can pass pleasant hours unsuffocated instead of places so full of heat and so saturated with moisture that it is painful to spend five minutes in them. It is one of the unsolved mysteries of gardening that people will spend large sums of money on erections that they dare not enter on a summer day. True, a few plants from these houses find their way on to the dinner table as a decoration, but it could be made quite as attractive without them and there is nothing to justify the expenditure and the penance involved. Why not a smaller, lower, unheated, and better-ventilated type of house in which Alpine flowers would flourish; and in which, because it was cool and dry and airy, human beings could also exist? There would be saving on construction, on fuel, and on water. And consider the beauty of Alpines grown in pots and pans. They are enchantingly beautiful. Being mostly small growers, quite a large collection can be grown in a small and inexpensive house. Here can be grown new acquisitions, the outdoor requirements of which, notably in respect to soil, have to be learned. Large quantities of seedlings can be raised, some perhaps for permanent cultivation in the house, others for the slopes and mounds in the open.

Propagation. Inasmuch as the methods of propagation differ with the various kinds, hints are given with the different plants in their places throughout the book. It may be said, however, that seed is procurable of many of the plants named in the tables on pages 14–18. It will be found interesting, and at the same time of practical value, to sow in shallow earthenware pans filled with a very fine sandy compost. The seed should be sown thinly and in most cases covered very lightly. A sheet of newspaper may then be laid over the pans and kept there until germination has taken place. The pans may be stood on a greenhouse shelf or in a frame.

(*b*) *USEFUL TABLES*

It is not easy to pick and choose among the many beautiful Alpine plants which are available, but the following have particular claims:

(1) *Beautiful Alpines which may be raised from seed.*

Kind	*Inches high*	*Colour*	*Soil*
Acaena microphylla	Trailer	Rose	Sandy
Achillea Clavennae	6	White	Ordinary
,, tomentosa	6	Sulphur	,,
Aethionema grandiflorum	18	Rose	Any if light
Alyssum saxatile citrinum	6	Pale yellow	,, ,,
Alyssum saxatile compactum	9	Yellow	,, ,,
Androsace carnea	4	Rose	Sandy loam
,, Laggeri	3	,,	,, ,,
,, lanuginosa	6	,,	,, ,,
,, sarmentosa	6	Rose and white	,, ,,
Anemone alpina	6	White, tinted	Peat
,, Pulsatilla	12	Violet	Limestone
,, rivularis	12	White	Peaty
,, sulphurea	9	Pale yellow	Peat
Anthemis cinerea	12	White	Dry, sandy
,, montana	12	,,	,, ,,
Antirrhinum asarina	Trailer	Yellow	Ordinary
,, glutinosum	6	White and yellow	,,
,, sempervirens	Trailer	White and purple	,,
Aquilegia alpina	9	Blue	Friable
,, glandulosa	12	Blue and white	,,
Arabis alpina	12	White	Any, if friable
,, aubrietioides	4	Pale purple	,, ,,
Arenaria balearica	3	White	Any
Armeria alpina	6	Purple	Friable loam
,, Laucheana	6	Crimson	,, ,,
Arnebia cornuta	12	Yellow, black spots	,, ,,
,, echioides	12	Yellow, black spots	,, ,,
Arnica montana	12	Yellow	,, ,,
Aubrietias in variety	6	Various	Any
Campanula Allionii	3	Pale violet	,,
,, carpatica	12	Violet	,,
,, ,, Isabel	12	Deep blue	,,
,, ,, Riverslea	12	,, ,,	,,
,, cenisia	6	Blue	,,
,, muralis	6	Purple	,,
,, pulla	3	Blue	,,
pusilla	3	Pale blue	,,

Kind	*Inches high*	*Colour*	*Soil*
Campanula Raineri	3	Lavender	Any
,, turbinata	6	Violet	,,
,, Waldsteiniana	3	Pale blue	,,
Cheiranthus Allionii	18	Orange	,, (likes lime-stone)
Convolvulus mauritanicus	Trailer	Violet	,,
Corydalis lutea	9	Yellow	Sandy or chalky
,, nobilis	9	,,	,, ,,
,, thalictrifolia	12	,,	,, ,,
Cyananthus lobatus	Trailer	Blue	Peat or leaf-mould
Cyclamen europaeum	3	Purple and white	Peat and loam
,, neapolitanum	3	Purple and white	,, ,,
Dianthus alpinus	3	Rosy purple	Any, the Pinks like chalk
,, arenarius	6	Pale purple	Any, but not damp soil
,, caesius	6	Pink	Any
,, deltoides	6	Rosy purple	,,
,, ,, Brilliant	6	Bright red	,,
,, glacialis	3	Rosy purple	,,
,, graniticus	6	Bright red	,,
,, neglectus	3	,, ,,	,,
,, superbus	12	Pale purple	,,
Draba aizoides	6	Yellow	Sandy loam
Dryas octopetala	6	White	Peat
Edelweiss	6	Woolly foliage	Any good, likes chalk
Erinus alpinus	6	Bright red	Sandy or chalky
Gentiana acaulis	4	Rich blue	Friable loam
,, bavarica	4	Deep blue	,, ,,
,, brachyphylla	3	Bright blue	,, ,,
,, Clusii	4	,, ,,	,, with lime
,, Freyniana	4	,, ,,	Friable loam
,, Przewalskii	12	,, ,,	,, ,,
,, verna	3	,, ,,	,, ,,
Geranium argenteum	6	Pale purple	Any
,, sanguineum	6	Purplish red	,,
,, ,, album	6	White	,,
Gypsophila repens	Trailer	White	Any good
Helianthemum vulgare in var. (Sun Roses)	Trailer	Many brilliant colours	Any dry, likes chalk
Heuchera sanguinea	18	Coral red	Any
Hieracium villosum	12	Yellow	,,
Houstonia caerulea	2	Pale blue	Moist peat or loam

Beautiful Alpines—continued.

Kind	*Inches high*	*Colour*	*Soil*
Hutchinsia alpina	2	White	Sandy or chalky
Iberis gibraltarica	9	White and	Any
,, jucunda	4	Crimson [purple	,,
,, Pruiti	6	White	,,
,, sempervirens	6	,,	,,
Incarvillea grandiflora	9	Bright rose	Friable loam
Ionopsidium acaule	2	Violet	Any
Iris pumila in mixture	6	Various	,,
Lewisia Howellii	6	Rose striped crimson	Sandy loam
Linaria alpina	Trailer	Violet and orange	,, ,,
,, cymbalaria	,,	Purple	,, ,,
,, ,, alba	,,	White	,, ,,
Linum alpinum	,,	Pale blue	,, ,,
Lithospermum prostratum	,,	Rich blue	,, ,,
Lychnis alpina	3	Purplish red	Any
,, Lagascae	3	,, ,,	,,
Mesembryanthemum tricolor	3	Rose and white	Sandy loam, hot site
Myosotis azorica	6	Azure	Any
,, rupicola	6	Deep blue	,,
Onosma albo-roseum	12	White or rose	Sandy loam
,, Bourgaei	12	Yellow	,, ,,
Oxalis Valdiviana	6	,,	Dry and friable
Papaver alpinum in var.	6	Various	Any
,, nudicaule in var.	9	,,	,,
Pentstemon glaber	12	Purple	Any good
,, heterophyllus	12	Blue	,, ,,
,, Menziesii	9	Purple	,, ,,
,, roseus	12	Rose	,, ,,
,, Scouleri	12	Purplish rose	,, ,,
Polemonium humile	6	Pale blue	,, ,,
,, reptans	6	,, ,,	,, ,,
Poppies. See Papaver			
Pratia angulata	2	,, ,,	,, ,, if friable
Primula Bulleyana	18	Apricot	Moist, friable loam
,, capitata	12	Rich purple	,, ,,
,, Cockburniana	6	Orange	,, ,,
,, denticulata	9	Lavender	,, ,,
,, ,, alba	12	White	,, ,,
,, farinosa	6	Purple	,, ,,
,, Forrestii	12	Yellow	,, ,,
,, japonica	24	Crimson	Moist peat bed
,, Lissadell Hybrid	18	Vermilion	Moist, friable loam

Kind	*Inches high*	*Colour*	*Soil*
Primula Littoniana	12	Lilac	Moist, friable loam
,, Poissonii	12	Deep purple	,, ,,
,, pubescens	3	Rosy purple	,, ,,
,, pulverulenta	24	Crimson	Moist, peat bed
,, rosea	6	Rose	,, ,,
,, sikkimensis	18	Yellow	Moist, friable loam
,, villosa	3	Red	,, ,,
,, viscosa	3	Rose	,, ,,
Ramondia pyrenaica	6	Violet	Loam and peat
Saponaria ocymoides	9	Rose	Any
Saxifraga Aizoon	6	Cream	,,
,, Burseriana	3	White	,,
,, cochlearis	3	,,	,,
,, Cotyledon	12	,,	,,
,, decipiens in var.	12	Various	,,
,, ,, bathoniensis	12	Rose	,,
,, Hostii	6	White	,,
,, lantoscana superba	9	,,	,,
,, longifolia	18	,,	,,
,, muscoides	12	Red	,,
,, oppositifolia	9	Purplish red	,,
,, Rhei	6	Rose	,,
,, Rocheliana	6	White	,,
,, umbrosa (London Pride)	12	Rose	,,
Sedum acre	3	Yellow	Sandy or chalky
,, album	6	White	,, ,,
,, Ewersii	9	Rose	,, ,,
,, kamtschaticum	9	Yellow	,, ,,
,, pilosum	3	Pink	,, ,,
Silene acaulis	3	Rose	Any friable
,, alpestris	6	White	Any friable
,, Schafta	3	Deep rose	,, ,,
Soldanella alpina	3	Pale blue	,, ,,
,, pusilla	3	Lavender	,, ,,
Stokesia cyanea	12	Blue	Sandy or chalky
Stokesia cyanea praecox (early)	12	Blue	,, ,,
Stokesia cyanea praecox alba	12	White	,, ,,
Thymus Serpyllum	Trailer	Purple	Any
,, albus	,,	White	,,
Tunica Saxifraga	,,	Pale purple	Any friable
,, rosea	,,	Rose	,, ,,
Veronica alpina	3	Blue	Any
,, Guthriana	9	,,	,,
,, repens	Trailer	,,	,,

Beautiful Alpines—continued.

Kind	*Inches high*	*Colour*	*Soil*
Veronica rupestris	Trailer	Blue	Any
,, saxatilis	6	,,	,,
Viola calcarata	6	,,	Any friable
,, cornuta	6	Blue and other varieties	,, ,,
,, gracilis	6	Violet	,, ,,
Wahlenbergia dalmatica	6	,,	,, ,,
,, Kitaibeli	3	Lilac	,, ,,
Wulfenia carinthiaca	6	Blue	,, ,,

It will be seen that the list embraces all the principal genera except Phlox, of which plants a few of the best kinds, such as divaricata and its varieties, reptans, subulata (setacea) and its varieties, frondosa, and verna, should be added. But besides the popular things, the list includes many choicer plants of great beauty. A start will doubtless be made with a selection of plants of the best kinds, and seeds of many others will be sown in order to provide a stock of material for extensions.

(2) *Alpines which will thrive in Partial Shade.*

Ajugas
Anemones
Aquilegias
Armerias
Arnebias
Campanulas
Gentianas
Hepaticas
Linarias
Myosotis
Primulas
Saxifragas
Sedums
Silenes
Soldanellas
Wulfenias

(3) *Alpines which will thrive in Full Shade.*

Anemone apennina and nemorosa vars.
Chrysosplenium Virginianum
Corydalises
Cardamines
Doodia
Epimediums
Eomecons
Funkias
Gaultheria Shallon
Hellebores
Hepaticas
Orobus vernus
Saxifraga Geum
Sisyrinchiums
Sedums
Thalictrums (dwarf species)
Tiarellas
Waldsteinias

Soil. It is a worry to many would-be growers of Alpines that different kinds of soil are so often recommended for different plants. To a certain extent this is unavoidable, but in practice the provision of peat and loam for those requiring these soils is not serious, because the body of the soil can be built up with whatever is avail-

able and pockets provided for those which need special fare. When the reader looks through the column devoted to soil he sees that a great many will thrive on the bulk soil provided and that it is only the few which need special provision; in fact, if the bulk is an ordinary loam with plenty of grit, such as sand, to make it friable, very few will need special pockets. It is of the first importance to provide adequate drainage; very few plants will thrive if there is stagnant moisture in the soil.

Winter Treatment. Loss of plants in winter could be reduced considerably if the grower would scratch over the surface in autumn and give a top-dressing of fresh, gritty soil or chips of stone, as this tends to reduce damp at the collar of the plant. Small squares of glass should be fixed over woolly-leaved kinds.

Pests. Slugs will be troublesome if there is much " cover " in the form of far-spreading or trailing things and the smaller, choicer kinds must be protected. For remedies, see Slugs.

Alströmeria, Peruvian Lily (al-stro-mē-ria. Ord. Amaryllideæ). Although nominally hardy, these handsome and distinctive tuberous-rooted plants are the better for a sheltered, sunny position. They also appreciate a well-drained sandy soil. In most cases they grow about a yard high, and have curiously spotted, tipped, or lined flowers. By removing faded flowers, a succession of bloom can be obtained for the greater part of the summer. The principal species are aurantiaca (aurea), orange with red streaks; chilensis, pink lined with yellow; Pelegrina, red, tipped green and spotted red; and versicolor (Peruviana), yellow, tipped green and spotted maroon. There are varieties of some of the species. Propagation is by division in early autumn or spring, but frequent disturbance is harmful.

Alternanthera (ăll-ter-năn-ther-a. Ord. Anarantaceæ). Although tender plants, such species, with their varieties in some cases, as amabilis, paronychioides, and versicolor, were much used in the flower garden during the old carpet-bedding days, but are little grown now. They have richly coloured foliage and can be kept close by cropping them hard with finger and thumb, thus forming low masses. Cuttings can be taken in spring from plants grown in a warm house in winter.

Althaea, Mallow (al-thē-a. Ord. Malvaceæ). A useful genus, which includes rosea, the popular Hollyhock (see Hollyhock). Another important plant is frutex, a handsome shrub (for which see Hibiscus syriacus; there are several varieties of it). Ficifolia is the Fig-leaved Hollyhock, and has fringed flowers.

Alum Root. See Heuchera.

Alyssum (ăl-ĭ-sum. Ord. Cruciferæ). Charming dwarf plants, with bright flowers produced in great profusion. Maritimum is a fragrant white perennial generally grown as an annual, sometimes under the name of Königa maritima. There is a variegated form which is in great favour as an edging plant and this is propagated by cuttings. Saxatile (" Gold Dust ") is a yellow-flowered perennial, and its variety compactum is highly popular for spring bedding, also for rockeries; there are other varieties, including a double, and a variegated. Propagation is by seeds or cuttings, the perennials also by division, but maritimum and saxatile compactum are generally propagated by seeds, the former in March or April to flower the

same year. Alyssums are not very particular as to soil, but do not care for a heavy, wet medium.

Amaranthus (am-ar-an-thus. Ord. Amaranthaceæ). Caudatus, the Love-lies-bleeding, and hypochondriacus, the Prince's Feather, are summer-flowering hardy annuals growing about 2 ft. high, and may be sown outdoors in spring. Melancholicus ruber, salicifolius, and tricolor are handsome foliage plants. The first is not infrequently used as a bedding plant where rich leaf-colour is wanted; the other two are more often grown in pots. Propagation is by seed, which should be sown on a hotbed, the seedlings pricked off when they begin to crowd each other, subsequently hardened in a cool house or frame, and potted as needed. They will appreciate abundance of root and atmospheric moisture. Loam, with a third of decayed manure and a sprinkling of sharp sand, suits.

Amaryllis (ăm-ar-ill-is. Ord. Amaryllideæ). The beautiful large-flowered hybrids which bloom in advance of their leaves in warm houses in winter are now called Hippeastrums. They are handsome pot plants, having flowers 6 to 9 ins. across, brilliantly coloured. The bulbs go to rest in summer, and may be re-started in batches in autumn and winter in order to get a succession of bloom. Grow in 5-inch and 6-inch pots. Amaryllis Belladonna (Belladonna Lily) is lovely in a sheltered place outdoors in September. The plants may be lifted and potted when they show bud. The leaves come after the beautiful rose flowers. There are several forms, differing in tint and size; rosea maxima, large, deep rose, is one of the best. Amaryllis formosissima is the Jacobean Lily, a plant which produces bright crimson flowers in May and is well adapted for pot-culture in an unheated greenhouse. Very little water is needed in winter, but a good deal in summer. Amaryllis purpurea, otherwise Vallota purpurea, is the brilliant scarlet Scarborough Lily, a fine plant for a cool greenhouse or room window; see Vallota. Amaryllis (Sternbergia) lutea is a beautiful little Crocus-like bulb with bright yellow flowers in early autumn, borne in advance of the leaves, suitable for the garden; it should be planted in late summer. Amaryllis (more correctly Nerine) sarniensis is the lovely Guernsey Lily, which requires the same treatment as the Belladonna.

Amber, Sweet. See Hypericum Androsaemum.

Amberboa (am-ber-bō-a. Ord. Compositæ). The species moschata is the same as Centaurea moschata (Purple Sweet Sultan); and A. odorata is the same as C. odorata (Yellow Sweet Sultan). See Annuals and Sweet Sultans.

Ambury (Anbury). The club-root of Greens. See Broccoli.

Amelanchier (am-el-ăn-chier. Ord. Rosaceæ). Alnifolia (florida) has purple flowers and grows 6 ft. high. Vulgaris, white, 6 ft., is the Mespilus Amelanchier of early botanists. Botryapium (canadensis, ovalis, sanguinea) is a hardy, free-flowering and attractive deciduous shrub with white flowers early in spring. Height 8–12 ft. Ordinary soil. Propagation by seeds, by cuttings in summer under a hand-light, or by layers in autumn.

American Aloe. See Agave americana.

American Blight. The Woolly Aphis, Schizoneura lanigera, attacks various trees, but principally Apples, which it often damages seriously, in part by its direct action, in part by preparing the ground for that

fell scourge, canker. It fastens itself on the roots as well as on the branches, and young trees bought-in should always be examined to make sure that there are none of the woolly tufts on them. The insect is really a brownish aphis, which has the power of covering its colonies with fluff. It pierces the bark and extracts the juice. Females bring forth living young in summer, and lay eggs in autumn; the former are termed viviparous. In case of a slight attack on a part of the tree easily accessible, paraffin oil or methylated spirits may be applied with a small brush, exercising care to bring the fluid to bear directly on the bodies of the insects, not on the trees. In the case of bad attacks on large trees this method is impracticable. The first step should be to apply water alone in a powerful spray, preferably through a hose-pipe, in order to wash away the fluff and expose the bodies of the aphides. Then a paraffin emulsion may be applied (see Paraffin) through a knapsack sprayer or spraying syringe. This may be put on while the trees are in leaf. If the trouble continues use the following as a winter spray:

½ lb. soft soap, 5 pints paraffin oil, 10 gallons soft water (see 1, 2, 3 below); 2 lb. caustic soda (see 4 below).

1. Dissolve the soft soap in 1 gallon of water.
2. Add the paraffin oil and beat up.
3. Pump through a spray nozzle and churn up the emulsion.
4. Dissolve the soda in 9 gallons of rain water.
5. Add the emulsion and apply.

In case of trouble from American blight on the roots, 2 oz. of bisulphide of carbon may be forced into the soil 2 ft. from the stem, avoiding the roots, in early summer, by means of a Vermorel or other injector.

American Cowslip. See Dodecatheon.

American Cress. See Cress.

Amides. Plant substances, such as asparagin, glutamin and tyrosin, formed by the splitting up of albumens.

Ammobium (am-ō-bium. Ord. Compositæ). The species alatum, white, 2 ft. high (the variety grandiflorum is superior), is best treated as a half-hardy annual, being raised from seed sown in heat in early spring, the seedlings hardened in a frame and planted out in May. Sandy soil. The flowers may be preserved as "Everlastings."

Ampelopsis. Virginian Creeper (am-pe-lŏp-sis. Ord. Ampelideæ). The common Virginian Creeper, Ampelopsis quinquefolia or hederacea, is an old plant, which is rightly falling into desuetude. It is rank, coarse, and lacks the beautiful colour of Veitchii, now called by botanists Vitis inconstans, which is a fine natural climber, giving rich tints before losing its leaves in autumn, and should always be planted in preference to the common. Propagation is principally by cuttings, which may be inserted in a greenhouse in September. The plant will grow almost anywhere, and most soils suit it. Injury to walls by dislodgement of mortar has been charged to it, but this is often due to birds picking out the mortar for grit with which to grind up hard food, as they do in the case of St. Paul's Cathedral. Probably the Ampelopsis does no harm when prevented from choking gutters.

Amphicome (am-phĭc-o-mē. Ord. Bignoniaceæ). The species arguta, a perennial with finely-cut foliage and lilac flowers in summer, 18 ins.

high, is offered by seedsmen. The seed may be sown in a greenhouse or frame in early summer for the plants to flower the following year. Subsequently, cuttings may be used if desired, in which case they should be taken in summer and inserted in peaty soil containing plenty of sand and covered with a cloche or hand-light. The plant is not hardy, and is generally grown in pots.

Amygdalus (ă-mig-dă-lus. Ord. Rosaceæ). This is the Almond genus (see Almond), which botanists have now referred to Prunus, Amygdalus communis consequently becoming Prunus Amygdalus. Several handsome spring-flowering trees are still grown under the old generic name, e.g. Amygdalus Besseriana (nana), the dwarf Almond, which only grows about 3 ft. high; orientalis (argentea), the Silver Almond, which has downy leaves and should have a sheltered place, or the bloom may be ruined by frost; and Boissieri, pale pink. Plant in autumn.

Anagallis (ăna-gal-is. Ord. Primulaceæ). Pretty plants, mostly grown as greenhouse annuals. Linifolia, blue, 1 ft. high, blooms freely in the greenhouse in summer; its variety Breweri is often offered by seedsmen. Both may be raised from seed in spring in the greenhouse, pricked off, and subsequently potted. Three parts loam, 1 leafmould, and ¼ part sand, suit.

Anchusa (an-kōō-sa. Ord. Boragineæ). Hardy annuals, biennials, and perennials, of which italica, a blue-flowered perennial, blooming in summer, and the Dropmore variety, are the most popular. The latter is very rich in colour and should be preferred to the type. There are other varieties, including Opal and Pride of Dover, both sky-blue. The Anchusas are vigorous growers, and should not be given very rich soil. Propagation is by division in autumn or spring, by cuttings of the thong-like roots in spring, or by seeds sown in spring, or by seeds sown in summer to give flowers the following year. Root cuttings are convenient. Pieces as big as the little finger, just covered with sandy soil in a box, quickly root in a frame or sheltered place outdoors.

Andraecium. The collective male organs of a flower. See also Gynaecium.

Andromeda (an-drŏm-e-da. Ord. Ericaceæ). The number of species in this genus has been greatly reduced by botanists, who have transferred them to other genera. This applies to the best known, floribunda, which is now called Pieris floribunda. It grows 3 to 6 ft. high, and bears white flowers in spring. Japonica, half-hardy, with long tufts of creamy bells, is now Pieris japonica. Of the rest, the most popular is the native polifolia, which grows about a foot high, and has pink flowers in June and coloured foliage in autumn. Well-drained sandy peat in a sheltered position suits. Propagation is by layers in autumn, or by seeds.

Androsace (an-drŏs-a-cē. Ord. Primulaceæ). Charming little rockery plants. Carnea, 4 ins. high, pink flowers in summer; Laggeri, pink, 3 ins. high, mossy; Chamaejasme, pink, 1 ft., hoary leaves, the Rock Jasmine; primuloides, rose, May, 4 ins.; lanuginosa, 6 ins., rose, summer; sarmentosa, 6 ins., pink, spring; and villosa, 4 ins., rose, spring, are some of the best. Chumbyi resembles sarmentosa. They thrive best in positions among stones where they get plenty of root but little overhead moisture. Small squares of glass should be fixed

for throwing off rain in winter. Propagation is by division in spring, or by cuttings inserted in sandy soil in a frame in summer. Peat, with a liberal admixture of sand and mortar rubbish, suits.

Anemone. Wind Flower (ă-nem-on-e. Ord. Ranunculaceæ). Anemones are among the most brilliant and useful of garden plants, and one kind or other can be had in bloom all the year round by using cool frames part of the year.

Fulgens Class. Very beautiful. Annulata, single scarlet; King of Scarlets, double scarlet; Rose de Nice, double pink; and Snowball, double white, are gems in this section. There are few spring pictures more exquisite than that formed by a bed of the brilliant scarlet Anemone fulgens in association with the double white Arabis—in itself almost as beautiful as Lily-of-the-Valley. And this Anemone produces lovely effects when grouped on the rockery with the smaller, soft-hued Narcissi, such as Johnstoni Queen of Spain, minimus, cyclamineus, Bulbocodium, pallidus praecox, albicans, and cernuus. It must have full sun, otherwise it may not bloom freely and disappointments on this score are by no means unknown. A comparatively dwarf plant, Anemone fulgens still has stem enough to be useful for cutting, and with a bed freely bloomed there will be a temptation which must not be condemned to gather some of the glittering flowers for the purpose of enlivening rooms. To insure an even bed of flowers, tubers may be planted in autumn, but a stock can be raised from seed. Botanists do not admit fulgens as a true species, classifying it as a form of hortensis, but it comes true from seed. The double fulgens is worthy of attention.

Coronaria Class. The glorious Alderborough, St. Brigid and Empress Anemones are varieties of coronaria, the Crown or Poppy Anemone, a species which, like hortensis, came from southern Europe upwards of three hundred years ago. Blooming later than fulgens, they form a beautiful succession and are just as desirable for beds, but no mixture is needed, as the colours vary considerably and make exquisite harmonies of their own. A happy way of dealing with the bed is to set corms of the fine scarlet Gladiolus brenchleyensis about 2 ft. apart among the upspringing plants in April, and in June or July, when the Anemone bloom is over, to set between them, at 18 ins. spaces, the lovely white Marguerite, Mrs. Sander, the foliage of which bears a sufficiently close resemblance to that of the Anemone to harmonise with it until it dies away. The Marguerite and the Gladiolus make the bed beautiful in July and August. Thus two entirely different but equally admirable effects are produced. Again, a bed of mauve Anemones has a beautiful effect, planted with late-flowering lavender-coloured Tulip Rev. H. Ewbank. These Poppy Anemones are easily raised from seed, especially if it is rubbed up in sand previous to sowing in spring; but tubers are available if autumn planting is desired, and they may be set 9 ins. apart.

Japonica Class. Japonica, a fine plant for the autumn border, is represented in many gardens by its white variety Honorine Jobert, but where hardy herbaceous plants are specialised, the named varieties with semi-double flowers are perhaps preferred. One cannot dispute the beauty of such varieties as Mont Rose, Silver Cup, Whirlwind, and Lady Ardilaun, but they are not necessary to the everyday flower-gardener, or to those who want flowers for

gathering. In any case plants of these special varieties will have to be bought, as the plants are not tuberous-rooted, and seed is not available. The plants should be kept under strict control in borders, as they spread rapidly at the root and soon encroach on other plants; they are quite capable of forcing their way through gravel paths.

Other species and varieties. In the garden of shade the wood Anemone, nemorosa, and its varieties, Allenii and Robinsoniana, also apennina, angulosa, and the Hepaticas, will assume an importance which they do not enjoy in sunny places. They are all beautiful, as also are alpina and blanda, and the lovely snowdrop Anemone (sylvestris), narcissiflora, white, 1 ft.; rivularis, white, 18 ins.; Pulsatilla (Pasque Flower), violet, 9 ins.; and ranunculoides, yellow, 6 ins. Blanda, deep blue, a winter bloomer, 6 ins. high, and its pink form rosea, are gems. The white (alba) and red (rubra) forms of Pulsatilla must not be overlooked.

Anemonopsis (ă-nem-on-ŏp-sis. Ord. Ranunculaceæ). The one species, macrophylla, pale lilac, 2 ft. high, is a perennial resembling the Japanese Anemone and suitable for the herbaceous border, but not quite hardy. Propagation is by division in spring.

Angelica (an-gel-ica. Ord. Umbelliferæ). A kitchen herb, used for candying and the seeds for flavouring. It can be raised from seed sown outside in September or spring. See also Herbs.

Angelica Tree. See Aralia spinosa.

Angelonia grandiflora (ăn-gel-ō-nia. Ord. Scrophularineæ). This is a tender herbaceous perennial, growing 1 ft. high, with large purplish scented flowers in May, seed of which is offered by some seedsmen. It should be sown in a warm house in late winter, and the seedlings pricked-off and potted in the usual way (see Potting). It should be kept in an intermediate house (see Greenhouse) in winter. A compost of peat and loam, with sand, suits.

Angel's Tears. Narcissus triandrus albus.

Angiosperms. Plants with covered ovules, and therefore embracing the majority of flowering plants. See also Gymnosperms.

Angraecum (ăn-grē-cum. Ord. Orchidaceæ). Tropical Orchids, several of which are both beautiful and fragrant; citratum, a dwarf species with lemon-coloured flowers, is particularly sweet; and falcatum, white, dwarf, is also perfumed. Eburneum, 1½ ft. high, white; and sesquipedale, 2 ft. high, with white flowers in winter and spring, are popular species. The latter, with its long spur, is particularly quaint and interesting. Propagation is by offsets in spring. Crocks and Sphagnum moss should be used instead of soil. The small kinds are generally grown in baskets, and the larger in pots. All love a moist, warm temperature, and in large establishments are grown in the East Indian house, in which a high temperature and a saturated atmosphere are maintained. The air may be kept a little drier when the plants are flowering, but arid conditions are fatal to them when they are making their growth.

Anguloa (an-gu-lō-a. Ord. Orchidaceæ). These handsome Orchids do well in an intermediate house, i.e. one with a winter temperature of 55° to 60°. At that season they may be kept fairly dry, and a saturated atmosphere must be avoided while they are in bloom in spring, but while they are making their growth in summer they enjoy abundance of root and atmospheric moisture. They should be

grown in crocks and Sphagnum moss. Soil is not required. Clowesii, 1½ ft. high, yellow, is perhaps the best-known species; but Ruckeri, 1½ ft., crimson and yellow, and uniflora, 1½ ft., cream, are also esteemed. There are several varieties of both these species. Propagation is by division.

Animated Oat. See Annuals (Ornamental Grasses).

Aniseed Tree. See Illicium.

ANNUALS: CULTIVATION AND SELECTIONS

Annuals are plants which complete their life-cycle, from germination to seed-ripening, within a year, but may become perennials if seeding is prevented. No experienced flower-gardener will neglect annuals, because they will have proved their worth to him. Bought in the first place very cheaply as seed, they will have shown that under a very simple system of culture they are capable of giving beautiful displays over a long period. Certain of the annuals, notably China Asters, Ten-week Stocks, Phlox Drummondii, Godetias, Clarkias, and Sweet Peas, are, indeed, amongst the most valuable of all garden plants, yet they can be bloomed from seed in a few weeks. They give beauty of flower, neat habit, long duration, and in some cases delicious perfume. For garden purposes it is convenient to divide the annuals into two sections, hardy and half-hardy, the former being sown out of doors, where they are to bloom, the latter in a greenhouse or frame and transplanted.

Sowing Hardy Annuals. Hardy annuals may be used for forming beds, or for patches in herbaceous and other borders. It is not often, perhaps, that a whole bed is given up to a collection of hardy annuals, but there is no reason why it should not be done. With tall things like Sweet Peas and the beautiful pink Lavatera towards the centre, and dwarfer kinds like Godetias, Nasturtiums, Clarkias, Larkspurs, Love-in-a-mist, Poppies, and Mignonette near the front, a bed of annuals would be really beautiful. In such a case they should be sown in groups. The ground should be well dug, and may have a dressing of manure if poor; but it is easy to make soil too rich for annuals, and if the mould is fertile, some burnt refuse and a handful of superphosphate per square yard will be preferable to dung. The surface may be left lumpy when digging, and raked down fine just before sowing. As the seed of many kinds is small, it is particularly necessary to prepare a fine tilth. From mid-April to mid-May is a good period to sow if the weather is favourable. Thought should be given to space. It is not prudent to sow patches of different kinds of plants within a foot of each other, making no allowance for their development. Remember that even a small quantity of seed may mean 50 plants in each patch. As a safeguard against crowding, which prevents the different kinds from being well displayed, and is bad for the individuals, every distinct kind should be sown in a ring as far from its neighbour as that plant grows high (see table). The ring system of sowing is preferable to a broadcast patch because it gives a defined area for each kind, and at the same time reduces the labour of thinning. For example, if a ring a foot across is reserved for, say, a particular variety of Godetia, and the seed is sprinkled thinly in a shallow circular drill, there is likely to be

much less seed used than if a square foot of ground is sown with the same kind; moreover, with fewer surplus seedlings there will be less thinning-out to do. Yet the ring of plants will be just as effective as the patch. It suffices to cover the small-seeded kinds with half an inch of soil, and the larger with an inch.

Thinning. Act before the plants have grown large enough to get tangled and weakly. A preliminary "run over" with finger and thumb when the seedlings are about an inch high facilitates the final "singling," as it gives a sturdy lot of plants to choose from. One sometimes sees 50 annuals crowding 6 ins. of ground; there should only be one plant on that area. Three or four plants will make a better clump in a small area than 100. Similar rings to those sown in a bed may be sown in selected positions near the front of borders. See Herbaceous Plants.

Sowing Half-Hardy Annuals. A simple method of raising half-hardy annuals is to fill some shallow boxes with fine soil about mid-March, draw shallow drills from back to front 2 ins. apart, sprinkle the seed thinly, and put a small label to each row. The boxes may be stood on a greenhouse shelf or stage, or in a frame. If they are put on a hotbed the plants must be hardened afterwards in an unheated frame. As soon as they begin to crowd in the seed boxes they must be pricked off 3 ins. apart in other boxes, kept in a light airy place, and only watered sufficiently to prevent flagging. By the time they begin to crowd again the weather will probably be mild enough for them to be planted out, or they may be potted singly if wanted for the greenhouse.

Summer Treatment Outdoors. Half-hardy annuals may be planted in beds, used as lines, or set in groups in mixed borders. After they have been planted they need practically the same treatment as hardy annuals which have been thinned. One point is hoeing, which is beneficial to all classes of annuals; it keeps weeds down and aerates the soil. Staking will only be needed with a few of the taller kinds, but when plants begin to sprawl about they should be drawn together and supported.

Slugs and Snails. Freshly slaked lime should be dusted over the plants at night. Or Sanitas may be sprinkled about. Most annuals bloom for a longer period than they would do naturally if the flowers are gathered before they have time to ripen their seeds.

I. GOOD HARDY ANNUALS

Name	*Feet High*	*Colour*
Abronia umbellata	Trailer	Rose
Agrostemma Coeli-rosea	1	Crimson
Alyssum, Sweet	1	White
Asperula azurea setosa	1½	Blue
Bartonia aurea	1	Yellow
Calendula	2	Orange, yellow, etc.
Candytuft, White Spiral	1	White
,, carmine	1	Carmine
Centranthus macrosiphon	1	Red

Name	*Feet High*	*Colour*
Chrysanthemum inodorum, Bridal Robe	¾	White
Chrysanthemum, Evening Star	1½	Yellow
,, Morning Star	1½	Primrose
,, Burridgeanum	2	Crimson, white, and yellow
Clarkia elegans, double	2	Various
,, ,, single	2	Various
,, ,, Firefly	2	Orange red
,, marginata	1	Rose and white
,, dwarf pink	1	Pink
Collinsia bicolor	¾	Lilac and white
,, candidissima	¾	White
Collomia coccinea	¾	Orange
Convolvulus major	Rambling	Various
,, minor	1	Various
Coreopsis coronata	1½	Yellow
,, Drummondii	1½	Brown and yellow
Cornflower	1	Blue, etc.
Erysimum arkansanum	1½	Yellow
Eschscholtzia crocea	1	Orange
,, Rose Cardinal	1½	Rose
Eutoca viscida	1	Blue
Evening Primrose, see Œnothera		
Gamolepis Tagetes	½	Yellow
Gilia dichotoma	½	White
,, tricolor	1½	Lavender and white
,, ,, alba	1½	White
Glaucium luteum	2	Yellow
,, phoeniceum	2	Orange
Godetia, Bridesmaid	1	Rose and white
,, Duchess of Albany	1	White
,, Lady Albemarle	1	Carmine
,, Lady Satin Rose	1	Rose
,, Schamini flore pleno	1½	Double rose
,, Lavender	1½	Lavender
Gypsophila elegans	1½	White
,, muralis	¾	Rose
Helichrysum (Everlasting)	2–3	Various
Ionopsidium acaule	¼	Violet
Jacobaea (Senecio)	1	Various
Kaulfussia amelloides	½	Blue, crimson
Kochia tricophylla (scoparia)	2	Handsome leafage
Larkspur, Butterfly	1	Blue
,, Dwarf Rocket	1	Various
,, Stock-flowered	2 to 3	Various
Lavatera rosea splendens	3 to 4	Pink
,, alba splendens	3 to 4	White
Layia elegans	1	Yellow
Leptosiphon hybridus	½	Various

Name	*Feet High*	*Colour*
Limnanthes Douglasi	½	Yellow and white
Linaria	¼	Various
Linum grandiflorum rubrum	1	Scarlet
Love-in-a-mist	1½	Blue
Love-lies-bleeding	2	Red
Lupinus Hartwegi	2	Blue and white
,, hybridus atrococcineus	2	Scarlet and white
,, ,, albus	2	White
Malope grandiflora	3	Red
Matthiola bicornis (Night-scented Stock)	1	Lilac
Mignonette, Giant	1	White
,, ,,	1	Red
,, Machet	1	Red
Nasturtium, Tom Thumb	1	Various
,, ,, ,, variegated-leaved	1	Various
Nasturtium, tall	Rambling	Various
,, ,, variegated-leaved	Rambling	Various
Nemophila insignis	½	Blue
,, ,, alba	½	White
Nigella, Miss Jekyll	1½	Blue
Œnothera rosea	½	Rose
,, Drummondii nana	1	Yellow
Phacelia campanularia	¾	Blue
Platystemon californicus	1	Lemon
Poppies, double	2	Various
,, Shirley	1½	Various
,, The Mikado	2	Rose and white
,, umbrosum	2	Scarlet, black spots
Portulaca, single	½	Various
,, double	½	Various
Prince's Feather	3	Red
Rudbeckia, Golden Sunset	1½	Yellow
Salvia, Blue Beard	1	Blue
Sanvitalia procumbens	½	Yellow
Saponaria calabrica	½	Pink
,, ,, alba	½	White
,, Vaccaria	2	Pink
Scabious, large-flowered	2½	Various
Schizopetalon Walkeri	½	White
Senecio, see Jacobaea		
Silene armeria	1½	Rose
,, pendula	¾	Pink
,, ,, compacta	¼	Pink
,, ,, alba	¼	White
Sphenogyne speciosa	1	Orange
Statice spicata (Everlasting)	1	Puce
,, Suworowi	1¼	Rose

Name	Feet High	Colour
Sunflower, double	3 to 8	Yellow
„ single	3 to 8	Yellow
Sweet Peas	6 to 10	Various
Sweet Sultan	1½	Various
Venus' Looking-glass	¾	Blue
Venus' Navelwort	¾	White
Virginian Stock	¾	Red, white
Viscaria cardinalis	1	Crimson
„ oculata	1	Pink, purple eye
Wallflower, annual	1	Various
Whitlavia grandiflora	1	Violet
Xeranthemum (Everlasting)	2	Various

For details see the various plants named in order throughout the book.

II. GOOD HALF-HARDY ANNUALS

Those marked *p* are good for pots. Those marked * are not true annuals although often grown as such.

	Name	Feet High	Colour
p	Acroclinium (Everlasting)	1	Rose, white
	Ageratum	1	Blue
*	Antirrhinums	1 to 2	Various
	Arctotis grandis	1	White, mauve, and yellow
	Asters, China, Comet	1½	Various
p	„ „ Chrysanthemum-flowered	1	Various
p	„ „ Dwarf Bouquet	¾	Various
p	„ „ Victoria	1½	Various
	„ „ Quilled	1	Various
	„ „ Ostrich Plume	2	Various
	„ „ Giant French	2	Various
	„ „ Paeony-flowered	1½	Various
	„ „ Comet	1½	Various
	„ „ Anemone-flowered	2	Various
	„ „ Sinensis (single)	2	Various
p	Balsam, Camellia-flowered	1½	Various
p	Brachycome (Swan River Daisy)	1½	Blue
p	Carnation, Marguerite	2	Yellow
p	Celosia plumosa aurea	2	Yellow
p	„ „ coccinea	2	Red
	Cobaea scandens	Rambler	Purple
	Cosmea (Cosmos) bipinnata	2½	Pink, white
*	Dianthus (Indian Pink)	1	Various
*	„ Heddewigii	¾	Various
p	Diascia Barberae	¾	Coral
	Dimorphotheca aurantiaca	1	Orange

	Name	*Feet High*	*Colour*
	Eccremocarpus scaber	Rambler	Orange
	Gaillardia, single	2	Shades of orange
	,, double	1½	Various
*	Gilia coronopifolia	3	Scarlet
*	Golden Feather	½	Yellow leaves
p	Heliotrope	2	Lilac, mauve
	Helipterum (Everlasting)	1½	Yellow
*	Lobelia speciosa	½	Blue
	Maize, Japanese Striped	3	Variegated leaves
	,, Four-coloured	3	Coloured foliage
	Marigold, French	1	Striped
	,, African	2	Lemon, orange
	Martynia fragrans	1½	Purple
*	Mimulus tigrinus	¾	Spotted on yellow
*	,, cardinalis	1	Scarlet
*	Mina lobata	Rambler	Cream
p	Nemesia strumosa Suttoni	1¼	Various
*	Nicotiana affinis	2	White
*	,, Sanderae	2½	Shades of red
*	Pansy	½	Various
	Perilla nankinensis	1½	Dark foliage
*	Petunia, single	1	Various
p	,, double	2	Various
	Phlox Drummondii	1	Various
	Ricinus Gibsoni	3	Dark foliage
p	Rodanthe (Everlasting)	1	Pink, white
p	Salpiglossis	2	Various
p	Schizanthus	1 to 2	Various
*	Statice sinuata hybrida	1½	Mauve, white, and yellow
p	Stock, Ten-week	1 to 2	Various
	,, Wallflower-leaved	1	Various
	Tagetes signata pumila	¾	Orange
	Venidium calendulaceum	¾	Orange
*	Verbena	1	Various
	Zinnia, single	1½	Various
p	,, double	1½	Various

Ornamental Grasses. A collection of ornamental Grasses which will thrive under the treatment given to hardy annuals as described above is a pretty and useful feature in the flower garden. The following may be selected: Agrostis laxiflora and nebulosa (Cloud Grass), Avena sterilis (Animated Oat), Briza maxima (Quaking Grass), Bromus brizaeformis, Eragrostis elegans, Hordeum jubatum, Lagurus ovatus (Hare's-tail Grass), Pennisetum longistylum, and Stipa pennata (Feather Grass). The sprays will be charming for vases if gathered before they mature.

Anomatheca (an-ō-măth-eca. Ord. Irideæ). The most popular species is cruenta, a pretty plant growing 6 to 9 ins. high, and bearing

crimson flowers in summer. It should have a warm spot on the rockery, or be grown in a frame. Bulbs can be obtained and planted in autumn.

Antennaria (an-ten-ā-ria. Ord. Compositæ). The species tomentosa is often used on the rockery as a silvery creeper. It thrives in ordinary soil, and is easily increased by division. A. margaritacea is the Pearl Everlasting, a native.

Anthemis, Camomile (ăn-them-is, commonly an-thē-mis. Ord. Compositæ). Showy border plants, thriving in almost any soil, and easily propagated by division in spring. Tinctoria, yellow, the dyer's Camomile, is one of the best, and there are several varieties; they grow about 2 ft. high and bloom in July. Biebersteiniana, yellow, 1 ft.; and Aizoon, May, white, are pretty. Nobilis, the common Camomile, has white flowers.

Anther. The upper part of the stamen of a flower and containing the pollen.

Anthericum (an-thĕr-icum. Ord. Liliaceæ). Graceful plants, of which Liliago, the St. Bernard's Lily; and Liliastrum, the St. Bruno's Lily, both growing 18 ins. to 2 ft. high, and bearing white flowers in June, are the two best known. There is a large variety of each called major. Propagation is by division of the root after flowering. A fertile, well-drained soil is desirable. They are hardy, and may be planted in autumn or spring.

Anthocyanin. A protective substance found along the food-canals of plants; it serves as a screen to prevent decomposition and to protect the chlorophyll. It accounts for the blue or red covering of young growths, for instance, the red stems of Paeonies, which start early. See a modern work on plant-chemistry.

Antholysis. A term for the changing of organs into leaves, as stamens into petals when flowers become "double." The parts are then multiplied.

Antholyza (an-tho-lȳ-za. Ord. Irideæ). The only species much grown in gardens is coccinea, a Montbretia-like plant with scarlet spikes of flowers in spring; height about 2 ft. It succeeds in any friable soil if the position is not exposed, but is not quite hardy. Propagation is by divisions of the clusters of corms in autumn or spring.

Anthoxanthum. The species odoratum is the Sweet Vernal Grass which scents the meadows; it is not much grown in gardens.

Anthurium (an-thū-rium. Ord. Aroideæ). Handsome stove plants, with large leaves and brilliant spathes, which may be scarlet, crimson, rose, or white. The best-known species are Andreanum, which has a scarlet spathe and a white spadix; and Scherzerianum, which is scarlet. There are many varieties of each, varying in size and colour. Veitchii and Warocqueanum are the two principal ornamental-leaved species.

Propagation. By dividing the crowns in spring, each portion with roots at the base.

Compost. Three parts of peat in a fibrous, lumpy state, 1 part of leafmould, 1 of Sphagnum moss, and 1 in equal proportions of broken crocks, charcoal, and sand. The pots must be thoroughly drained with abundance of crocks.

Heat and Moisture. The plants enjoy moisture, and a good deal of water should be given throughout the summer, both at the roots

and in the atmosphere. This, combined with occasional repotting as needed, and a temperature with a night minimum of 65°, will insure free and healthy growth. Shade is required during hot sunshine. In winter a temperature 10° less will suffice, and less water will be needed.

Anthyllis, Kidney Vetch (an-thĭll-is. Ord. Leguminosæ). The species Barba-Jovis (Jupiter's Beard) is a downy shrub with yellow flowers in spring, height 4–6 ft. Montana is a hoary rock plant with purplish flowers, 9 ins. high; alba is a white variety. These are the only two species generally grown. They like a friable soil and a warm situation. Propagation is by seed, or by cuttings under a hand-light in summer.

Antirrhinum, Snapdragon (an-tir-hī-num. Ord. Scrophularineæ). Antirrhinum majus, as represented by its beautiful modern offspring, has developed into a florists' flower, and the varieties are grown under special names, like Roses and Sweet Peas. The plant is especially esteemed in Scotland, where much good work has been done in developing it. Varieties of one colour only, such as crimson, rose, yellow, and white, are procurable in seed; and these are suitable for groups and masses. But there are also beautiful forms with flaked and striped flowers. A bed is both bright and interesting. The type, which has pink flowers, grows about 2 ft. high. There is a dwarf strain called the Tom Thumb, which only grows about 9 ins. high. Compact strains between the two (Intermediates) can be obtained, and they are perhaps the most useful of all, growing as they do about 18 ins. high. The value of the Snapdragons lies almost as much in their long period of blooming, and their adaptability to nearly all kinds of soil, as in their beautiful flowers. They grow continuously for several months, and almost every little side-shoot forms flower buds. If fading flowers are cut off, fresh shoots appear and bloom.

Soil. They will thrive in shallow, chalky soil; and they will luxuriate in cool clay. While, however, the Snapdragon never grows more vigorously than on damp clay soils, the growth which it makes on such ground is soft and sappy, and in no way so floriferous as that which is formed on limestone. This is sometimes overlooked by cultivators, who fail to realise that they are only getting a tithe of the beauty which the plant is capable of producing, and indeed misconception is easy when the plants look so well. Lime, even in the crude form of lumps of chalk, may be added to heavy soil with nothing but benefit. The plants are not necessarily weaker, for Antirrhinums grow luxuriantly on soil which forms the shallowest of layers over solid limestone; it is simply that the chalk encourages a harder and more floriferous type of shoot.

Propagation. By seeds and cuttings. It is always well to raise some from seed, because, if care is taken to get it from a well-known florist, good new varieties are quite likely to appear. If sown in a greenhouse or frame in February or March, the seedlings pricked off and kept sturdy by being grown close to the glass and given plenty of air, then planted out about a foot apart in May, the plants will be in flower before midsummer. It is a great point in connection with this splendid plant that the varieties come almost as true from seeds as good species, consequently, the most natural of all systems

of propagation meets the principal needs, but this fact is to a certain extent discounted by the readiness with which Snapdragons lend themselves to cross-pollination by bees. The amateur gardener often wonders why the Snapdragons which he has saved at home fail to come true, while the seedsman's packets give him, with little variation, the colours described in the catalogue. The explanation is that the seedsman's Antirrhinums are grown in beds so far apart that the same set of bees cannot get from one to the other with pollen, whereas the amateur's plants are so close together that one set can visit many varieties and effect numerous crosses. Free a seeder, therefore, as the Antirrhinum is, it is not an ideal plant for home saving in cases where distinct colours are required. The amateur who wants to perpetuate a particular variety must circumvent the bees by taking cuttings, which alone can be relied on to reproduce the coveted variety in small gardens. And it is satisfactory to know that cuttings root readily in a frame, or even in gritty soil in the open ground, in late summer; nor need the propagator fear to use tips with flower-buds on them, bad as this class of wood is for cuttings in the case of most plants.

Art Shades. It is in the intermediate class that we find the best range of beautiful "art" shades. The Tom Thumbs are much wanting in these exquisite tones; otherwise they are useful enough for small beds, blooming long and profusely. Fawn, terra-cotta, salmon, and other "art" shades, such as are found in the Intermediates, would strengthen the Tom Thumbs considerably. Their squat growth calls for relief from a taller, looser plant, such as that beautiful half-hardy annual the Salpiglossis, or coloured Tobaccos (Nicotiana Sanderæ) or even Ostrich Plume Asters. Each amateur buyer of Snapdragons will pick colours to his taste from the catalogues, and happily for him the range is both beautiful and wide.

The evergreen trailing species Asarina, with yellow flowers in summer, is suitable for the rockery. See Alpine Flowers.

Ants. Gardeners dislike ants among their plants, because, whether they do any direct injury or not, they certainly encourage aphides. They probably do direct as well as indirect injury, particularly to fruits. The best means of reducing their numbers is to trap them with old bones, or with pieces of sponge smeared with treacle; boiling water will do the rest. Paraffin oil also disturbs them. If these remedies fail, make a strong decoction of Elder leaves and pour it on the nests, or mix powdered borax and sugar in equal proportions, and spread about their haunts in dry weather.

Aphides, Green Fly, Black Fly, etc. Aphides or sucking flies are familiar to all gardeners, because one species or another attacks almost every class of plant. The green fly of Roses, Solanums, and greenhouse and garden plants generally; the black fly of Asters and Broad Beans; the green, blue, and black flies of various fruit trees, are all species of aphis. If the aphides are allowed to multiply they speedily increase to such an extent as to all but smother the plants they attack, and their rapidity of increase is such that a few individuals soon grow to as many thousands. Although aphides produce eggs, they may bring forth living young (viviparous) if the eggs are not fertilised. It is wise to attack them directly they are seen, and fortunately they are easy to kill. In glass structures,

periodical fumigation with one of the specialities which are sold in various sizes to suit large and small houses by nurserymen, seedsmen, and dealers in horticultural sundries, provides a ready and inexpensive means of keeping them down. Once a fortnight will suit in the growing season. An ounce of washing soda dissolved in a gallon of water heated up to 150° forms a simple destroyer of aphides, and may be syringed on to outdoor plants through gloved hands. A decoction of quassia (see Quassia) is good. A paraffin and soft-soap emulsion (see Paraffin) is cheap and efficacious. Various proprietary washes are advertised for the purpose, and may be applied according to the directions supplied with them.

Apios (ā-pī-os. Ord. Leguminosæ). The species tuberosa is the Ground Nut, a twining perennial with brownish-red flowers in summer, and edible tuberous roots. It likes a warm sandy soil and a sheltered position.

Aponogeton (ă-pŏno-gē-ton. Ord. Naiadaceæ). The species distachyon is the charming white, scented Winter Hawthorn, which floats on the water and flowers from late summer onwards to winter. It may be grown in a tank, under glass or outdoors; or in a pool if the roots are sunk a foot below the surface. Abyssinicus, a modern species with lavender-blue flowers, succeeds under the same conditions.

APPLES: CULTIVATION AND SELECTIONS

By common consent the Apple (Pyrus Malus. Ord. Rosaceæ). is the most valuable of all hardy fruits and happily it is not difficult to obtain good crops.

Stocks. It is desirable for the beginner to learn at the outset the importance of stocks, because Apples are rarely grown from seeds or cuttings. If we go into a fruit nursery in summer we see trees which are like and yet unlike Apple-trees. The leaf resembles the leaf of an Apple, but the trees are not bearing any fruit (or if any, it is insignificant) and they are of a somewhat spreading habit, as though they had never been systematically pruned like the long ranks of Apple-trees. Another thing which strikes us about them is that some of the branches have been drawn to the ground and are partially covered with mounds of soil. These are Paradise stocks—trees whose fruit is useless, but whose fibrous root system makes them valuable as foster-parents to Apples, which are budded or grafted on to them.

The drawn-down branches will push roots into the mounds of soil, and after being severed from the parent stock, will be planted in long lines to themselves; in three years at the most they will grow out into sturdy little bushes and be ready for grafting. If we take one up, we find that it has no tap root, but only a mass of fibres spreading in a shallow network.

Budding. Proceeding through the nursery, we find young stocks from the main stem of which pieces of raphia are drooping, and examination reveals that buds have recently been cut out of varieties of Apples which are to be propagated and inserted in the stems of the stocks, one in each about 6 ins. above the ground. If our visit is paid in early August we may find the work of budding actually

going on, but in September it will be finished. We see the budder slicing pieces about 1½ ins. long out of the Apple shoots of the current year's growth, each piece with a dormant growth bud in it; we see him cleverly picking out the pith at the back of the bud; we see him inserting the piece hollow side inwards within a T-shaped cut made in the stem of the stock; and we see him tying the bud in firmly but not very tightly with raphia.

Maiden Trees. Another stage in the nursery, and we see in summer a tree with single stems 4 to 6 ft. high. These are the offspring of the previous year's budding. The 4, 5, or 6-feet stem has grown from the little bud put in the year before; and it has done all this work since April, because the bud did not start growing before winter, lying dormant, or apparently dormant, in the stock from the late summer of one year till the spring of the next. This sapling Apple-tree is called a " maiden." It is shortened to half a yard high in winter.

Older Trees. A little farther, and we find a plantation of two-year-olds, or trees a year older than the maiden. The mark of the shortening just referred to is clearly discernible. Side branches have pushed from the thickening bole and have extended 2, 3, or even 4 feet; whatever their length, they are shortened in their turn in autumn to a third of their length, and we see the result when we come to the three-year-olds, where the second bifurcation reveals itself.

Cordon Trees. A modification of this practice of shortening and encouraging side branches is observable when we come to the cordons. These may have only one stem even when several years old. There is the preliminary shortening of the maiden as for the bush tree; thenceforward, the leaders are allowed to extend against strong stakes and the side growths are removed.

Bushes, Standards, and Espaliers. Our nursery inspection of the Apples shows us that by far the largest proportion of trees are bushes, and that next to them come " standards "—trees on tall, strong stems, which have probably been raised on Crab or Free (seedling) stocks, and not on Paradise stocks. These standards are more suitable, we see, for orchards or large gardens than for small gardens, because of their wide-spreading heads. In some nurseries we may find that there are more cordons than standards; in others the reverse. But we find fair quantities of another type of tree—a flat tree with branches in tiers 1 ft. apart, one above another, to a height of 6 ft. or more. These are the " espaliers " for training on walls and fences—splendid trees, but a little expensive, because of the cost of the early training.

Summer Pruning. So much for the propagation and the formation of different types of tree; now let us look into the fruiting parts of the older trees, in order to round off our preliminary lessons. It is near the end of the summer and we find fruits on the older wood, but not on the quite young wood of the current year's growth, which has now finished extending, as we see by the bud at the very end. This young wood comes from various parts of the old wood. The pruner shows us that he " summer prunes " the side shoots, except in the case of the few varieties (Irish Peach, Lady Sudeley, and Cornish Gilliflower are, we find, the most prominent of them) which

bear their fruit on the young wood when it is in its second year. Summer pruning means, we perceive, shortening the young side-shoots to within five or six leaves of the base, where, later, a fruit bud forms as a result. In winter the remainder of the shortened shoot is pruned back to an inch or two.

General Pruning. Not the least interesting of the lessons which we learn from our ramble among the fruit trees is that an appreciable amount of pruning can be done in summer with benefit to the future crop. But we are glad to know that summer pruning is not vital, because during August and September we have much to do in other departments of the garden. If we can fit a bout of summer pruning in we resolve that we will. Nay more, we are so impressed with the spectacle of the heavy crops of large fruit on the maturer trees, that forthwith we begin to scheme out plans for providing time to thin out and regulate some of the crowded veterans at home, so that haply we may, by reducing the tangle of wood to order and clarity, induce them to give us better fruit. Those which are full of spindly, in-growing wood we will thin rigorously in autumn or winter, working with one of the nursery models before our mind's eye, and taking care that when our task is done, not a single in-growing shoot is left on the tree.

Soil in Relation to Pruning. The student of fruit-pruning is sometimes nonplussed when he reads or hears advice on the one hand urging the importance of making soil fertile in order that the trees may be encouraged to start away strongly, and on the other that excessive growth is undesirable, because it tends to retard fruiting. There is certainly an apparent if not real inconsistency, but it is not always easy in practice to strike the happy mean with exactitude. The grower wants his trees to grow healthfully, and rather than have them drag, he would have them luxuriant. But moderate growth is the best—that is to say, growth represented by an extension of 2 or 3 ft. per shoot per year. Heavy loam will give this without much manuring; chalk or sandy soil only with liberal manuring, except in the case of the strongest sorts. This point of the different habits of varieties makes the matter hard to generalise upon. Perhaps it might be put in this way: if the annual growth exceeds 3 ft. per shoot, the trees are too vigorous; if less than 2 ft., they are weak. Luxuriance, which is often accompanied by sparse flowering, can be counteracted by root-pruning, weakness by manuring.

Grafting. Paradise stocks which are not budded in summer as described above are grafted in the following spring, the heads being taken off 6 ins. from the ground, a downward cut made in the sloping first cut, a piece of Apple shoot 5 ins. long of the previous year's growth fitted in after making corresponding cuts in the base to those on the stock, and the whole area round the cuts bound with raphia and coated with a wax of resin, tallow, red ochre, and Burgundy pitch melted together in the proportions of 8, 3, 3, and 1. The process is called " tongue " grafting. If grafting old trees instead of young stocks, we should have to adopt a different system because of the thicker wood, slicing the bark down to a length of a couple of inches with the point of a knife after shortening the branch to a stump, cutting a scion with a thin, sloping face, slipping it into the

slit and pressing it carefully down so as to avoid splitting, tying round, and waxing as before. This is " crown " grafting.

Varieties. Observing the behaviour of varieties, we see that Early Victoria, Lord Derby, Lane's Prince Albert, Warner's King, Bramley's Seedling, and Newton Wonder (forming a succession) are good culinary croppers, and that others worthy of culture where space permits are Stirling Castle, Ecklinville Seedling, Keswick Codlin, Lord Suffield, Lord Grosvenor, Golden Spire, Grenadier, Royal Jubilee, Norfolk Beauty, and Wellington. Of dessert sorts, Beauty of Bath, Allington Pippin, Rival, Charles Ross, Worcester Pearmain, Cox's Orange Pippin, James Grieve, Blenheim Pippin, Roundway Magnum Bonum, Adams's Pearmain, Sturmer, Baumann's Red Winter Reinette, and William Crump are good, and form a succession.

In view of the extension of the disease " scab " (see below) it may be noted that Cox's Orange Pippin, Lord Suffield, Ecklinville Seedling, and Yellow Ingestrie (Golden Pippin) are very susceptible. Bramley's Seedling, Grenadier, Golden Spire, Lord Derby, Beauty of Bath, Newton Wonder, The Queen, Wellington, Gladstone, Warner's King, Keswick Codlin, and Cox's Pomona are less susceptible.

Fertilisation. A fact that is interesting in itself, besides being important from a practical point of view, is that few varieties of Apples can fertilise themselves and therefore that varieties which produce pollen freely, such as Baumann's Winter Reinette, Bramley's Seedling, Grenadier, Early Victoria, Worcester Pearmain, Lord Derby, and Newton Wonder (note that all these appear in our select lists), should always be planted, because with flies and bees at work their abundant pollen passes from flower to flower and assists cropping. A large block of trees might bear badly for no other reason than that it wanted the pollen from another sort to assist in its fertilisation.

Frost and Apples. Is the district a cold one, where late frosts are apt to work havoc? Then let us take care to plant some late-blooming varieties, such as Keswick Codlin, Northern Greening, Royal Jubilee, Bramley's Seedling, Newton Wonder, Court-Pendû-Plât (often called the Wise Apple, because of this late-blooming habit), King Edward VII, and Dutch Mignonne. We are then pretty sure of a crop.

Thinning. Thinning the clusters of fruit which often form thickly in spring to two or even to one fruit per spur is wise, because the tree produces larger fruits of higher market value with less strain on the tree. But dessert varieties should not be very large.

Apple Enemies. Nothing that we learn about Apples impresses us more than the importance of keeping the trees free from caterpillars, insects, and fungi. Here is a summary of some of the worst pests of the Apple, with suggestions for subduing them:

Canker. A fungus which flourishes on enfeebled constitution, injury to the bark, and poverty of soil. In most cases the best remedy is manure, either in the form of a mulch of yard manure or a dressing of an artificial fertiliser, such as the following: ½ part sulphate of ammonia, 1 part steamed bone flour, 2 oz. per square yard from the bole of the tree to the farthest spread of the branches. Badly infected wood to be cut away or shortened and the faces of wounds brushed with tar.

Black Scab. This affects the shoots and fruit, causing dark patches

and cracks. The remedy is to spray with a pound of bluestone dissolved in 25 gallons of water when the leaves are unfolding, repeating when the petals fall, and again a fortnight later.

Powdery Mildew. This affects the young shoots, covering the ends with a white meal. The remedy is ½ oz. of fresh liver of sulphur (sulphide of potassium) dissolved in a gallon of water, and sprayed on when the disease is seen.

Brown Spot. This affects the fruit. Small brown dots are seen, which disfigure the fruit, and, working into the flesh, cause decay. The remedy is again liver of sulphur, at the strength just recommended, sprayed on as soon as the spot appears.

Spring-feeding Caterpillars. These include Winter Moth, Lackey Moth, Small Ermine Moth, Tortrix Moth, Mottled Umber Moth, and Vapourer Moth. Every year the greenish caterpillar of the Winter Moth does enormous mischief by attacking the flowers and foliage directly the buds burst. Immediately it is seen the trees should be sprayed with 2 lb. arsenate paste in 50 gallons of water. Bands coated with grease are sometimes tied round the boles in autumn to prevent the moths ascending to lay their eggs.

Codlin Moth. Attacks the young fruit and eats right in, with the result that it falls later, with a dirty hole near the eye. The above spray, applied before the fruit turns down, is efficacious.

Apple Sucker (*Psylla*). This is the yellow wingless larva of a green, filmy-winged insect which is seen flitting about in autumn. The sucker feeds on the buds in spring. Remedy: 6 lb. soft soap, 8 lb. quassia extract, 100 gallons of water, sprayed on in spring.

Blossom Weevil. In some districts a weevil eats into the fruit bud just before the breaking stages, and by destroying the fertilising organs, prevents fruit forming; a lime spray is recommended.

Moss and Lichen. When the branches of fruit trees tend to become green they should be cleansed. A lime spray is an excellent cleanser, but in bad cases something more may be required, and it may be found in caustic soda. 1 lb. of this, with 1 lb. of pearl-ash, in 10 gallons of water, will cleanse the wood if sprayed on in winter.

Apple Aphis (Aphis pomi). The aphis infests the shoots. See Aphides.

American Blight. See American blight.

Blossom-wilt and Brown-rot. See remarks under Plum.

Capsid Bugs. Greenish oval bugs about ¼ in. long which have become very destructive during recent years. 1 lb. soft soap and 1½ oz. nicotine 95–8 per cent strength in 20 gallons water, used at 80–100° is a good remedy, if used in May and June.

A General Spray. There are many pests in addition to the above, but the multiplication of remedies becomes serious; rather would one reduce them if possible. The best all-round plan is to spray the heads of the trees with a lime-sulphur wash (procurable from all seedsmen and agricultural chemists) in spring and later, varying the strength according to the season of application (stronger when leafless than when in leaf). To be more exact, 2½ gallons of lime-sulphur preparation and 4 lb. arsenate of lead may be used to 100 gallons of water when the trees are in young leaf if there is fungus, and also caterpillar. There are, however, one or two prominent varieties,

notably Cox's Orange Pippin, which are liable to injury from the spray. If preferred, a modern tar-distillate spray, obtainable from seedsmen, can be used for the above enemies. It should be sprayed on at the strength recommended on the packets in January or February. This type of spray has tended to displace lime-sulphur during recent years.

Planting. The method of planting Apples has a direct bearing on their health. If the soil is broken deeply, well manured, and the trees are planted with a shallow coat of thoroughly firmed soil surfaced with manure over the roots, they will generally make vigorous and healthy growth which can be kept clean without much difficulty. Very few Apples will thrive on a damp site, or on shallow sand or chalk. The best culinary variety for poor soil is Bramley's Seedling, and the next best perhaps Newton Wonder. Both should be planted, the former in the larger quantity. The best for dessert on such soil is Worcester Pearmain. Other things being equal, heavy soil is better than light for Apples, but it should not be stiff clay, which is often damp and always expensive to work. A dark loam is best. Avoidance of crowding is desirable; an average of 12 ft. apart for bushes and 30 for standards is justified, as it is easy to crop between them until they require all the ground. But it is pernicious to crop close up to the stems, even with vegetables, as is often done. A south or south-west aspect is better than a northerly or easterly one. The contiguity of water is no disadvantage, provided the site is well drained, because the temperature is more equable. November is perhaps the best month to plant, but trees can be put in up to mid-March with suitable weather. Stakes, where necessary, should be put in with the trees.

For storage of Apples, see Fruit.

Apricot (Prunus (Armeniaca) vulgaris. Ord. Rosaceæ). One of the most delicious of the stone fruits, the Apricot is also one of the most capricious. It is difficult to suit in soil, and even in good loam on limestone, which is the ideal soil for stone fruits, it often casts its main branches after a few years. It should be given firm soil with plenty of lime rubble. It blooms very early, and on this account should not only have the protection and support of a wall, but should have tiffany or netting hung in front of it while in flower when frost threatens. In starting with Apricots it is best to buy a young trained tree from a fruit dealer, and plant it in autumn. If it grows very strongly root prune it.

The Apricot gives fruit on young wood, but is not so markedly a young-wood fruiter as the Peach, as it will bear on the ripened wood. A framework of mature wood, with a moderate amount of young wood between, will give satisfactory crops, other things being right. As regards varieties, Moor Park is particularly liable to branch-casting; it is, however, almost indispensable, owing to the fine quality of the fruit. Shipley's and Breda are less liable to premature decay, but the fruit is not so fine. Powell's is a good late variety.

Aquatic Plants. See Water and the Sunk Garden.

Aquilegia, Columbine (aquil-ē-gia. Ord. Ranunculaceæ). The graceful Columbine is one of the most popular of hardy herbaceous flowers, and there are few gardens in which it is not represented. The

majority of the species are best suited for borders, but a few are well adapted for the rockery. The Columbines begin to flower very early, often being in bloom in May, and they continue for a long period. They are useful for cutting.

Species and Hybrids. Alpina, a charming blue rockery plant, 1 ft. high; caerulea, 15 to 18 ins., blue and white (caerulea hybrids, 18 to 30 ins., obtainable from seedsmen, give a variety of colours, and the flowers have long spurs); chrysantha, 3 ft., yellow; glandulosa, blue, lilac, and white, 1 ft., an exquisite but short-lived plant that needs frequent renewal, and of which there are several pretty varieties; habulata alba, white, May, 1 ft.; pyrenaica, blue and lilac, only a few inches high, suitable for the rockery; sibirica, 10 to 12 ins., blue, good for rockwork; Skinneri, 2 ft., red, green, and yellow; and Stuarti, 9 ins., blue and white, a charming hybrid, are the principal species and hybrids.

Propagation. By seeds, sown outside in June, transplanted in August, and flowering the following year; or in frames in spring to get strong plants early; also by division.

Soil. The strong kinds will thrive in almost any soil, from clay to chalk. The weaker ones, like glandulosa, pyrenaica, and Stuarti, should have a light, warm, well-drained loam.

General Remarks. Splendid mixtures of long-spurred hybrids in separate colours and mixture are now offered by seedsmen. They make lovely clumps or beds, and are valuable for cutting. They are perennial when established, but, like the Snapdragons, they get crossed considerably by bees, and that is why one finds it well to raise a stock as biennials each year, sowing in spring or early summer. Special varieties can be kept and increased by division, with care, when they have become strong. Those who raise their hybrid Columbines under glass and plant them out in early summer must be prepared to give them a certain amount of attention, otherwise the groups will gradually melt away. Drought is probably the chief cause and watering is the best remedy. Of the plants which live and thrive, the strongest may be found in bloom before the summer is over; but the grower should base his highest expectations on the late spring of the following year, when the plants will be at their best. Then, indeed, no plants of their season will command greater interest or evoke a more lively admiration.

Arabis, Rock Cress (ăr-a-bis. Ord. Cruciferæ). Very cheap and easily grown plants, flowering off and on in mild spells throughout the winter, but at their best in spring, when they grow rapidly, and bloom as they extend. They are charming on the rockery, in bulb beds, at the front of mixed borders, and at the edge of basins of aquatic plants.

Species. Alpina and albida, both white-flowered and much alike, but the former a little dwarfer and more compact than the latter, are the two principal. The double white variety, flore pleno, is very graceful, having long spikes of bloom, and lasts well. Lucida variegata, which has pretty green and yellow leaves, is also a useful species. Aubrietioides has large pink flowers; Billardieri much resembles it. Alba variegata has a white-edged leaf.

Propagation. The singles by seed, sown outdoors in May or June for flowering the following season; by cuttings, or by division after

flowering; the double by cuttings, which may be taken from the clumps after flowering, and struck in sandy soil in a frame, or in a shady spot out of doors.

Arabises grow well in all soils, and no special provision need be made.

Aralia (ă-rā-lia. Ord. Araliaceæ). Handsome foliage plants, some hardy, others requiring a greenhouse or stove. The most popular species, japonica or Sieboldii (now called Fatsia japonica by botanists), is much esteemed as a greenhouse and room plant, being grown for its large, dark green, deeply-cut leaves. Elegantissima and Veitchii gracillima are two beautiful sorts, but they require a warm house. The same remark applies to Kerchoveana and Reginae. Racemosa is hardy. Japonica and most of the indoor species are propagated by cuttings of ripe wood, preferably in bottom heat; Veitchii gracillima by grafting; racemosa by division. A. spinosa, a hardy shrub with small white flowers in autumn, the so-called Angelica Tree, is increased by suckers. 3 parts loam, 1 leafmould, and ½ part sand suit. A. chinensis is the same as the feathery-leaved shrub, bearing creamy panicles of bloom in autumn, sometimes met with under the name Dimorphanthus mandschuricus. It is handsome at the waterside in mild districts.

Araucaria (ar-ăw-cā-ri-a. Ord. Coniferæ). A large genus of Conifers, which embraces the well-known Monkey Puzzle, imbricata, one of the few really hardy kinds, and a conspicuous object in the pleasure grounds of many places.

Indoor species. Excelsa is the most important of the greenhouse species, and it has several varieties, such as glauca, Goldieana, and variegata. They make nice table plants. We have had healthy plants of excelsa forming successive tiers for many years in a living-room. All are evergreens.

Propagation. By cuttings, the tops of plants being first struck, and then the shoots which start from the old stumps; they root readily in sandy loam and leafmould in a greenhouse if kept shaded.

Compost. Three parts loam, 1 leafmould, ½ part sand for the pot plants. The Monkey Puzzle is not very fastidious, but does best in a deep, well-drained, loamy soil.

Arbor Vitae (Thuya). Cheap, hardy, and easily grown evergreens, often used for hedges, as well as for individual effect. When planted for forming hedges they should be inserted about 9 ins. apart. They are not quite so cheap as Privet and Thorn, but have a little more distinction. The American Arbor Vitae (Thuya occidentalis) is the species most largely used for this purpose. It should be remembered that there are cases of stock having been poisoned by eating it, although no injury has followed in others. Propagation is by seeds or cuttings. Almost any soil that is deep, substantial, and well-drained will suit. See also Thuya.

Arbour. See Flower Garden: Summer-houses.

Arbutus, Strawberry Tree (ār-bū-tus. Ord. Ericaceæ). Arbutus Unedo is a handsome evergreen shrub, growing from 8 to 15 ft. high, and bearing white flowers in September, which are followed by scarlet fruits somewhat resembling Strawberries, and suitable for eating when quite ripe. There are pink and red-flowered varieties of it. It is hardy, generally speaking, though it may be injured in severe

winters if planted in an exposed place in a cold district. The species Andrachne has greenish-white flowers in spring. Propagation is by seeds sown in spring, or by layers in autumn. Warm well-drained peaty soil is desirable.

Arches. See Flower Garden: Arches.

Arctostaphylos (arc-tos-tăph-y-los. Ord. Ericaceæ). The species Uva-ursi is the British evergreen trailer with rosy flowers commonly called Bearberry. It is occasionally grown in gardens in peaty soil.

Arctotis (arc-tō-tis. Ord. Compositæ). Most of the species are downy hardy perennials, but the grandis is good as a half-hardy annual (see Annuals, half-hardy). The flowers are white with mauve centre and surrounding band of yellow, height 1 ft. Ordinary soil. Propagation by seeds.

Ardisia (ār-dis-ia. Ord. Myrsinaceæ). The only species much grown, and that less frequently than in past years, is crenata (crenulata), which is valued less for the white flowers than the attractive berries. We have had a plant in full berry the whole winter in a living-room. It likes a warm greenhouse while growing. Loam and peat, with sand, suit. Propagation is by pieces of stem or root, preferably in bottom-heat.

Areca. See Chrysalidocarpus.

Arenaria (aren-ā-ria. Ord. Caryophyllaceæ). The most popular species is balearica, a little plant with shiny leaves and white flowers on short stems in summer. It is useful for the rockery, covering the faces of stones. Montana, white, 4 ins., serves the same purpose. Ordinary soil in a cool place suits. Propagation is by seeds, or division in summer, the parts being shaded from hot sun and kept moist.

Argemone, American Prickly Poppy (ār-ge-mō-ne. Ord. Papaveraceæ). Mexicana (grandiflora) is worth growing as a hardy annual, its large silky-white flowers with golden anthers being very attractive. Ordinary soil. Sow seeds outside in spring (see Annuals). Height 2ft.

Arils. Processes which develop from the base of a flower and form a mantle over the seed.

Aristolochia, Birthwort (aristo-lō-kia. Ord. Aristolochiaceæ). Singular climbers, some evergreen, others deciduous; some hardy, others tender. One of the best known is Sipho, the "Dutchman's Pipe," a hardy climber with curious brown and yellow flowers late in spring, and with handsome foliage. The most remarkable of the indoor species is gigas Sturtevantii, a stove climber in bloom from May to November, with immense greyish flowers furnished with a long tail. We have seen a plant carrying 130 flowers. The young flowering shoots should be cut back when they go out of flower. Propagation is by cuttings of young wood with a heel, preferably in a propagating case. Three parts loam, 1 each decayed manure and leafmould, ¼ sand, suit the indoor kinds; ordinary garden soil suits Sipho.

Armeria, Thrift (ār-mē-ria. Ord. Plumbagineæ). The well-known Thrift (maritima) is a pretty plant for edgings and rockwork. Its variety Laucheana is still more attractive, the colour being deeper. Caespitosa, with lilac flowers; cephalotes (latifolia) and its fine rose form splendens; and plantaginea, with its forms splendens and Glory, both having bright rose flowers, are also nice sorts. Ordinary fertile, friable soil suits. Propagation is by division.

Arnebia, Prophet Flower (ar-nēbia. Ord. Boragineæ). Arnebias cornuta and echioides are pretty dwarf plants, suitable for the front of a border, or for rockwork. The former, which grows 18 ins. high, and has yellow flowers in July, is an annual, and may be grown from seed sown under glass in spring. It likes a loamy, gritty, well-drained soil. Echioides grows about 9 ins. high, is a perennial, and has yellow flowers with five black dots (" Marks of Mahomet," hence the name Prophet Flower) in late spring; the spots fade as the flowers age. It is propagated by cuttings or pieces of root in spring in heat. It thrives in any good soil if not dry.

Arnica montana, Mountain Tobacco (ar-nĭ-ca. Ord. Compositæ). A hardy herbaceous perennial growing 1 ft. high, with yellow flowers in summer, suitable for the border or rockery. Seed is offered, and may be sown outside in early summer. Propagation may also be effected by division in spring.

Arrowhead. See Flower Garden: The Water Garden.

Artemisia (ar-tem-ĭs-ia. Ord. Compositæ). The only species much grown in gardens is Abrotanum, that shrub of piquant perfume known as Southernwood. Ordinary soil. Propagation is by cuttings or division. Dracunculus is the herb Tarragon, which see. Lactiflora, with milk-white flowers in autumn, is a splendid evergreen species 2–3 ft. high, but is little known. It is best grown in the greenhouse.

Artichoke. There are two distinct kinds commonly grown in gardens, namely, the Globe and the Jerusalem; a third, the Chinese, is seen occasionally. The Globe Artichoke (Cynara Scolymus) gets its popular name from the large, globular flower-heads, which are cooked and eaten with sauce. They are produced throughout the summer. The plant is a hardy perennial and dies to the root in the autumn. The large Green Globe is a good variety.

The Jerusalem Artichoke (Helianthus tuberosus) produces tubers, which form the edible part. They do not contain starch, and their close texture, no less than their somewhat earthy flavour, renders them unpalatable to many. The plant is a strong grower, and should be planted at the end of the garden, where it will not interfere with other crops, and where it will also form a wind-break.

Propagation of Globe Artichokes. To get a stock of plants in the first place, seed is sown in spring, heat being given if it is desired to push the plants on rapidly, but not otherwise. The seedlings can be thinned, and a year later put out in rich soil 4 ft. apart. Subsequently the stock can be increased by taking off suckers in April, and it is well to do this every two or three years, as old plants soon get worn out.

Soil. Plant in deep, well-manured soil, as the plant is a gross feeder. Ashes may be heaped round the plants in autumn. Chards are the young growths that push as a result of cutting down the Artichokes in July, after a crop of heads has been taken; they are blanched with straw when 2 ft. high.

Propagation of Jerusalem Artichokes. By tubers about 1 oz. in weight, planted 6 ins. deep, and 18 ins. apart, in rows 3 ft. asunder, in spring.

Soil. A light, well-drained, poorish soil is best if the crop is grown for home consumption; deep, rich, moist soil may yield a heavier

crop, but the produce will be coarse. The tubers may be lifted in November and covered with straw and soil similarly to Potatoes.

The Chinese Artichoke. This plant (Stachys tuberifera) has small, corkscrew-like tubers of agreeable flavour, by means of which it is increased. They may be planted 9 ins. apart, in rows 18 ins. asunder, in spring. They like a well-drained, warm soil, but not a great deal of manure, which causes coarseness. The crop may be lifted and stored in sand in the autumn.

Artificial Manures. See Manures.

Artillery Plant. See Pilea.

Arum (air-um. Ord. Aroideæ). The Arums are distinguished by singular flowers, resembling those of the Arum Lily in form, and in some cases by marked leaves. Italicum, which grows about 18 ins. high, and produces greenish-white flowers in April, is perhaps the best-known species. It has variegated leaves, and is hardy. Maculatum, with its poisonous scarlet autumn berries, is the native Cuckoo Pint. Palaestinum or Sanctum, sometimes called the Black Calla, requires greenhouse cultivation. Cornutum is the so-called "Monarch of the East." The flowers are red, spotted with black; and the stems are spotted. It should be kept dry in winter, and needs protection from frost. Crinitum has immense red spotted flowers, and marked stems; Dracunculus has mottled stems, large leaves, and purplish flowers. Propagation is by division in spring. Any good, moist garden soil suits. Nearly all are better for litter over the roots in winter.

Arum Lily. This plant, which is remarkable for its beautiful white spathe, is grown under various names, such as Lily of the Nile, Calla aethiopica, Richardia aethiopica, and R. africana. The last is now the accepted botanical name. Although the plant will sometimes pass the winter out of doors unharmed, it is not hardy, and is almost universally grown for flowering in winter and spring. It is particularly in demand for church decoration at Easter. Arum Lilies are often planted out in the garden in summer, and potted up about the middle of September. They will do in a minimum winter temperature of 45°, but require more heat for early winter bloom.

Varieties. There are several garden varieties of it, notably Childsiana and grandiflora, which are very large; Little Gem, a miniature form; Pearl of Stuttgart, dwarf; and The Godfrey, another miniature form. All are white. There are two yellow Arum Lilies, namely, Elliottiana and Pentlandii. The latter has dark green leaves with reddish petioles. Both sorts are beautiful.

Propagation. By division or offsets in spring.

Compost. Three parts loam, 1 part decayed cow manure, ½ part sand.

Arundinaria (ă-rŭn-din-ā-ria. Ord. Gramineæ). A genus of Bamboos, several of which, notably Falconeri, 6 to 8 ft. high, green foliage; Hindsii, 8 to 12 ft.; japonica, 6 to 8 ft. (also known as Bambusa Metake); auricoma, 2 to 4 ft.; humilis, 3 to 4 ft.; and nobilis, 8 to 10 ft.; are hardy. Falcata and Veitchii require a greenhouse. Like the other two genera of Bamboos, Bambusa and Phyllostachys, the Arundinarias are the better for shelter when grown outdoors, as they are liable to be severely cut by cold winds. They do best in a

moist climate. When they have flowered they die. Propagation is by division. Loam, peat, and leafmould make a suitable compost.

Arundo, Great Reed (ă-run-do. Ord. Gramineæ). Arundo conspicua, with its fine, silky white panicles, which may rise to 8 ft. high in August, is no mean rival to the Pampas Grass. It looks best in a bed on grass near water. Donax is still taller, often attaining to 12 ft. Although the panicles are reddish at first, they fade off white. There is a dwarf variety of this called versicolor, which has variegated leaves. Propagation is by seeds or divisions in spring. Any cool, moist garden soil suits; a thin, dry soil is not good.

Asclepias, Swallowwort (as-clē-pĭ-as. Ord. Asclepiadeæ). The best-known species is the hardy tuberosa, a North American tuberous-rooted perennial, 2 ft. high, with orange flowers in late summer. Propagation is by division. Seed of curassavica, 2 ft., is offered, but should be sown in heat in late winter, as the plant needs a warm greenhouse. If potted as required (see Potting), and given a sandy compost of loam with a little leafmould, it will flower the first year. The clusters of orange flowers are very gay.

Ascospores. The spores of moulds. Asci are the tubular sporangia (spore-cases) of the moulds.

Ash (Fraxinus). The Ash is one of the best-known of timber trees, and is handsome in parks and large pleasure grounds, but should not be planted in small gardens, owing to the greed of the roots, which rob the crops. Fraxinus americana is the White Ash, excelsior the common Ash, and Ornus the Manna Ash. There are several varieties of each. The weeping and variegated forms of the common Ash are often preferred to the species for pleasure grounds. The wood of ash is tough and elastic and gardeners like it for the handles of their tools. Propagation is by seeds in spring for the species, and by grafting for the varieties. Any fairly fertile soil, not very dry, suits. It is not happy on dry chalky soils.

Ash, Mountain, Rowan. This is quite distinct from the ordinary Ash, and belongs to a different genus — Pyrus, the species being Aucuparia. It is a very handsome tree, and is in great demand for gardens, on account of its prettily cut foliage, and still more on account of the bright orange berries which it bears in late summer. It does not, as a rule, grow to very large dimensions, a tree 25 ft. high is a good specimen. There are several varieties; one, with yellow fruit, is called fructu-luteo; others are distinguished by particularly erect or pendulous habit, or by variegated foliage. The Mountain Ash should not be overlooked when trees are being chosen for the garden, and it will grow in most soils. Standard trees on 6 to 9 ft. stems should be purchased and planted in autumn.

Asparagus, Culinary. Asparagus officinalis is one of the most delicious of all garden vegetables, and as it is much more easily and inexpensively grown than many people suppose, there is no reason why it should not be grown in nearly all gardens. Special raised beds are only necessary in heavy, damp soil.

Propagation. By seeds, which may be sown in April in well-pulverised soil, in drills 1 ft. apart. If the plants come very thickly they may be thinned, and then, by the end of the season, they will be sturdy little specimens 1 ft. or 18 ins. high, and with a nice mass of fibrous roots. They may be transplanted in spring—that is, a

year from sowing—into rows 2 ft. apart, and the plants a foot asunder. In another year they may be transplanted to the beds. Cutting is possible the second year from seed, but a year later is better.

Soil. Asparagus likes a friable, well-drained, warm, loamy soil, but it will thrive in clay if well drained and pulverised. Mortar rubbish and road-sweepings will improve stiff ground. The soil should be cultivated deeply, and dressed liberally with decayed yard manure. Only moderate success may be expected on thin soil overlying chalk, unless the chalk is broken up, and the ground deepened by manuring, and by mulching with manure, wood ashes, and leafmould.

Forming Beds. In the olden days very elaborate beds were prepared for Asparagus. The soil was excavated, and in the pit thus formed faggots were laid, which were covered with roots and garden refuse. The soil, heavily manured, was put on this foundation. If the ground is drained with pipes this is unnecessary, even in the case of clay, as there is little fear of the soil becoming sour through the accumulation of stagnant water. In undrained clay it would be a wise precaution to adopt some such plan. To make a pair of beds proceed as follows: After preparing the soil mark out two strips 4 ft. wide each, with a 2-ft. strip between them. Throw the soil from the 2-ft. strip to the depth of a foot right and left. The alley thus formed will serve as a path, and the soil thrown out will deepen the soil of the beds.

Planting. Asparagus may be planted any time in April. It does not matter if growth has started, so long as the roots are not allowed to get dry; drought is very bad, and throws the crop back seriously. If it is desired to get a bed more quickly than can be done from seeds, roots should be purchased from a nurseryman or seedsman. Three-year-old plants will be of a suitable strength. A 4-ft. bed will accommodate 2 rows of plants, which may be inserted triangularly instead of exactly opposite to each other, in parallel rows. The clumps may be 1 ft. from the edge of the bed, and 18 ins. apart. They consist of a central crown and a mass of large fibres, which may be spread out and covered with 4 ins. of soil.

Summer Culture. The bed should not be cut from the first year, but growth encouraged by frequent hoeing, which will serve the double purpose of aerating the soil and keeping down weeds.

Autumn Treatment. The growth will ripen off in October, and at the end of that month it may be removed, and the bed top-dressed with short decayed manure, or (and preferably in the case of damp soil) burnt refuse. Near the sea, seaweed may be heaped on the beds.

Spring Dressing. A spring dressing consisting of 2 oz. superphosphate of lime and 1 oz. nitrate of soda per square yard will do good; or common salt may be applied at the rate of 4 oz. per square yard.

Cutting. Heads may often be cut in April, and in May cutting will be general. It should cease at the end of June. An Asparagus knife is often used for the purpose, but is not essential. It consists of a short handle, a long piece of round steel, and a short, toothed blade which severs the stem when thrust into the ground. The heads are ready to cut when a brownish-green knob about 2 ins. long, and as thick as a finger, protrudes through the soil. The head should not be left till it is several inches long and the scales are bursting.

Large Blanched Asparagus. French growers secure very large blanched Asparagus by growing a giant variety in rich soil, and earthing it as it pushes through the soil. Immense quantities are exported to Great Britain. It has only a small green tip, and is very wasteful if cooked in the ordinary way, as before the blanched part is soft the tender green tip is scattered. It should be cooked on end until the white part is soft, and only laid on its side to finish off the green tip.

Forcing. An early crop of Asparagus may be secured by forcing. One plan is to place a light framework of laths over the bed and cover it with hot manure. Another is to make up a hotbed, cover it with light, friable soil about 4 ins. deep, pack the roots in with a few inches of soil over them, and then place a light on. Where a heated pit is available the roots need merely be packed in soil, watered as required, and brought on in a temperature of about 65°. Where forcing is practised it is advisable to have a constant succession of roots coming on, so that the forced roots, which are greatly weakened, can be thrown away.

Asparagus Beetle. The greenish larvae of the Asparagus beetle (Crioceris asparagi) do much harm by feeding on the young shoots and foliage; and the bluish beetle itself, which is about ¼ in. long, also feeds. Should an attack be noticed, boil ½ lb. soft soap in a gallon of water, stir in ¼ lb. each of soot and flowers of sulphur, dip the shoots in, and afterwards syringe.

Rust. This fungus disease sometimes blackens the foliage in summer. Before the attack has got far, spray with Bordeaux Mixture (which see).

Varieties. Connover's Colossal is very reliable. Early Giant Argenteuil is also good.

Asparagus, Ornamental. The ordinary Asparagus of the kitchen garden is sometimes pressed into service for ornamental purposes in its season, but other species are superior, and are available at different periods.

Asparagus Fern. Plumosus and its variety nanus are particularly esteemed for cutting, as they are graceful and lasting. Popularly known as "Asparagus fern," they rival the Maidenhair in favour for associating with cut flowers.

For Baskets. Sprengeri and its variety variegatus are charming basket plants; retrofractus is also good for this purpose.

For Pillars. Verticillatus is a graceful, vigorous species suitable for growing up a pillar under glass, and bears abundance of red berries.

Smilax. Asparagus medeoloides is the plant popularly called Smilax, which grows freely when cut back annually, trained to perpendicular strings in a warm house, and syringed.

Cultivation. All will succeed in a warm greenhouse in a compost of loam and leafmould (equal parts) with sand. Propagation is by seed and division of the roots.

Aspen. This tree is a species of Populus (tremula, or trembling Poplar). Owing to the petiole, or stalk of the leaf, being flattened at right angles to the plane of the leaf near the blade, a very light wind suffices to move it; consequently, the leaves are in motion when other foliage is still. It is a good tree to plant in damp places.

There are several varieties of it, including a weeping form. Dry chalky or sandy soil does not suit the Aspen.

Asperula (as-pĕr-ula, often as-per-ū-la. Ord. Rubiaceæ). The most useful species is the seedsman's azurea setosa, which botanists call orientalis, and is commonly grown as an annual. It has blue scented flowers in spring. The white-flowered British plant called Sweet Woodruff is Asperula odorata. Hirta forms a white carpet in July.

Asphodelus (as-phō-dē-lus. Ord. Liliaceæ). One or two of the Asphodels are worth including in the herbaceous border, notably ramosus, a tall, white-flowered plant, which blooms in spring, and will grow in a shady place. Acaulis is a much dwarfer plant with pink flowers. Treat as herbaceous plants.

Aspidistra (aspi-dis-tra. Ord. Liliaceæ). The popular Parlour Palm is about the best of all plants for rooms, halls, and corridors, as it will endure draughts better than almost any other plant. Watering as needed, and an occasional sponging or standing outdoors in a warm shower, keep it in good health a long time. The species lurida and its form variegata are extensively grown. Sandy loam suits them. Propagation is by division in spring, at which season the plants should be repotted when they need it, but that is not often, provided enough water is supplied to keep them from flagging.

Aspidium, Shield Fern (as-pid-ium. Ord. Filices). A genus of ferns to which botanists have now added Cyrtomium and Polystichum, together with certain minor genera; consequently, the ferns still commonly grown as Polystichum aculeatum, P. angulare, and P. Lonchitis (respectively the Hard Shield, the Soft Shield, and the Holly ferns) are now classed as Aspidiums. There are several handsome forms of the first two, notably aculeatum proliferum and angulare grandiceps. The Shield Ferns like cool shady places in the garden, with soil in which peat and leafmould abound. Propagation is by spores or division in spring.

Asplenium, Spleenwort (as-plē-nium. Ord. Filices). A large and important genus of ferns, including kinds suitable for cool and warm greenhouses, rooms, and gardens. The Lady Fern, once called Athyrium filix-foemina, is now classed with the Spleenworts by botanists.

Species and Varieties. The following are the principal species: Adiantum-nigrum, the Black Spleenwort, hardy (acutum is a nice form of it); bulbiferum, a greenhouse species and one of the best of room ferns, producing tiny swarthy plantlets on the fronds, by which it can be propagated (Fabianum and laxum are good varieties); Ceterach (Ceterach officinarum), the hardy Scale fern; falcatum, a greenhouse species; filix-foemina, the Lady Fern, hardy, of which Barnesi, dissectum, and Victoriae are good forms; flaccidum, greenhouse, good for baskets; Nidus, the Bird's-nest fern, a graceful species requiring a warm greenhouse; and Trichomanes, the Maidenhair Spleenwort, hardy. The general treatment advised under Ferns suits the greenhouse species. The hardy species with their varieties enjoy the conditions suggested for Aspidiums above.

Assimilation. The old term for the taking-in by plants of carbon-dioxide from the air and its disintegration into carbon and oxygen; now generally called Photosynthesis.

Aster, Annual. The "China Asters" of flower gardens are offspring of the species offered by seedsmen under the name of Aster sinensis, but now named by botanists Callistephus hortensis (chinensis). It is unnecessary to enlarge on the beauty of the China Asters, or their value as late-blooming annuals. British, German, French, American, and Italian raisers have all given us strains of high merit.

Types. The English Aster, of which a typical class is the Victoria, is distinguished by large and massive flowers mounted on rather short, sturdy stems; the American, such as Ostrich Plume, by tall, freely-branched plants of an altogether looser habit, the flowers smaller and less formal. They are perhaps the best for bedding, and certainly the Comet and Ostrich Plume types are superior for this purpose to the old English exhibition types such as the Quilled, the Paeony-flowered, the Chrysanthemum-flowered, the Bouquet, and even the Victoria. But all these classes have great beauty of bloom to recommend them, and their comparative stiffness can be discounted by planting among them things of rather taller and looser growth like Salpiglossis.

Transplanting. No small share of the value of annual or China Asters as flower-garden plants lies in the fact that they can be grown in reserve quarters until midsummer, and then lifted and planted in beds from which earlier plants have been removed. Is the reader a Pansy lover? Then he can sow the fine modern strains of bedding Pansies of which mention is made under Pansy, and put the plants in his beds in autumn. They will be beautiful the following year up to mid-June (later in moist districts) and can then be taken out and Asters substituted. This plan of growing Asters is really better than bedding them up earlier, because disease may have developed and affected plants can be removed while the plants are in the nursery bed.

Asters in Herbaceous Borders. Borders can often be brightened tastefully by planting groups of China Asters in the front areas in summer. They may be set near Pyrethrums, for instance, which are generally over before the summer is far advanced. While their perennial relatives, the Asters proper of the botanist and the Michaelmas Daisy or Starwort of the amateur, are beginning their great task of enlivening the back areas of the border, the smaller but equally beautiful Chinas will give cheerfulness to the front. The chief cultural points are dealt with under Annuals (half-hardy), and the principal types are described in the table of good half-hardy Annuals which accompanies those notes. See Annuals.

Disease. Annual Asters often collapse suddenly when they should be in full beauty. The failure is due to Stem-rot Fungus (Phytophthora cryptogea), the best remedy for which is Cheshunt Compound, which see. Directly any trouble is seen the affected plants should be destroyed and the remainder watered with the Compound. If Asters are to be grown again on the same site the soil should be watered with a 2 per cent solution of 40 per cent formalin to act as a disinfectant.

Compost. A very rich compost should be avoided. Good sandy loam, with wood ashes, is better than a compost containing a large proportion of decayed manure or leafmould. If large flowers are wanted thin the buds rather than give rich soil.

Aster, Perennial, Michaelmas Daisy, Starwort (Ord. Compositæ). These are among the most popular of hardy herbaceous perennials, not least because they flower in late summer and autumn, when bloom is getting scarce. The general cultivation recommended under Herbaceous Plants (which see) suits Asters, and the principal types are named in the tables which accompany those notes. It should be mentioned, however, that there are now many modern varieties, and that the number increases year by year; in fact, the Michaelmas Daisy has become a "florists' flower." The double varieties are interesting. Special sorts can be increased by cuttings in frames in spring, but division of the clumps, which should be done every two years at the most, the outer portions being preferred to the inner for replanting, suffices for the cheaper types.

Astilbe (as-til-be. Ord. Saxifrageæ). This genus popularly includes "Spiraea japonica" (Hoteia japonica), an herbaceous plant, of which roots are sold in large quantities by bulb dealers in autumn for spring bloom. It thrives in ordinary bulb soil, and if given plenty of water it will throw up beautiful white plumes in abundance. It may be put into rooms when coming into bloom. The true Spiraea japonica is a shrub (see Spiraea).

Species. Astilboides, 3 ft. high, a spring bloomer; rivularis, 4 ft., a summer bloomer, good for the waterside; simplicifolia (rosea is a red form), 9 ins., and Thunbergi, 2 ft., a spring bloomer, are all good species with white flowers. All except simplicifolia, which is best on the rockery, may be grown in borders in moist places.

Hybrids. The fine hybrid Astilbes or Spiraeas known as Arendsii, with such forms as Peach Blossom, Queen Alexandra, Granat, Ceres, and Gladstone, should not be overlooked. They can be easily forced in pots for winter bloom.

Propagation. By division in spring.

Astragalus, Milk Vetch (as-trag-alŭs. Ord. Leguminosæ). A large but not very important genus. Perhaps monspessulanus, an evergreen trailer which produces purple flowers in early summer, is the most useful, as it can be used for the rock garden. It may be propagated by cuttings in a cold frame, sandy soil being used.

Astrantia (as-tran-tia. Ord. Umbelliferæ). Hardy herbaceous perennials, thriving in ordinary well-drained, friable soil, and propagated by division in spring. Carniolica, 9 ins., white, and major, 18 ins., striped, are perhaps the most esteemed, both flower in early summer.

Athyrium. This name is still used for the Lady Fern, but botanists now class it with the Aspleniums, which see.

Atragene. The plant sometimes grown under the name of A. alpina is now called Clematis alpina. The species sibirica and austriaca are the same. It is a beautiful hardy climber with purplish-violet flowers in spring and summer, and liking fertile loamy soil.

Atriplex. Hortensis rubra is the red Orache, which is sometimes grown as a substitute for Spinach in large gardens.

Atropa. The species Belladonna is the Deadly Nightshade, which is only cultivated for medicinal purposes.

Aubrietia, Rock Cress (aŭ-briē-tia. Ord. Cruciferæ). Splendid dwarf hardy plants for the rock garden, and for carpeting and margining beds. They are evergreen, form dense tufts, and are in flower most

of the year. We find it a good plan to clip them very close after the chief flowering; they are soon full of fresh growth. Cuttings can be struck in sandy soil in a shady place; or seed can be sown under glass in March or outside in May. Any soil. The species are not much grown nowadays, preference being given to such varieties as Dr. Mules, violet; Lavender, grey leaf and mauve flowers; H. Marshall, violet with white eye; argentea variegata, white-edged leaf; Fire King, rosy magenta; Moerheimii, grey leaf; Leichtlinii, deep red; Bougainvillea, mauve; graeca, purple; and violacea, violet.

Aucuba (aū-cū-ba. Ord. Cornaceæ). Useful evergreen shrubs, which will grow in almost any soil, in sun or shade, in town or country, and bear abundance of beautiful berries if both kinds are planted. (The sex-flowers are on different plants). The species japonica has green leaves marked with yellow, but there are several garden forms of different colours. Propagation is by cuttings outdoors in spring or autumn, and by seeds.

Auricula, Bear's-ear (aū-rĭc-ula. Primula Auricula. Ord. Primulaceæ). Although the show or " stage " Auricula of the florists has hard work to hold its own nowadays, the border varieties tend to grow in favour. Stage Auriculas have a band of paste round the tube, and a margin of green, grey, and white round the border colour, unless they have a yellow or dark margin, in which case they are called selfs; border varieties are double the size, and mostly run in shades of yellow, primrose, cream, and white. Alpine Auriculas have large flowers and rich colours, such as violet, plum, purple, and blue.

Propagation of Alpines. No lover of spring flowers should fail to sow a mixed packet of Alpine and border Auriculas every spring. If the strain is good, some charming varieties are sure to appear. Any particularly good ones can be propagated and kept true by dividing them after flowering, and planting them out in a cool spot in rich soil. These Auriculas are well adapted for filling a spring bed in company with coloured Primroses, Polyanthuses, and Oxlips. They may be planted a foot apart in autumn.

The Show Auricula. This is a more delicate plant, and should have frame culture all the year round. The good exhibition varieties increase but slowly, therefore they are never likely to be cheap. They are repotted in late spring, when any offsets which have formed are removed and potted separately, to be grown on into flowering plants. A compost of loam (4 parts), decayed manure and leaf-mould (1 part each), and sand, is used. A suitable size of pot for the old plants is 5 ins. The frame is set to face north for the summer, and is fully ventilated. In autumn it is turned to the south, and watering is reduced, very little being given in winter. The plants are looked over periodically for louse, which is brushed off and destroyed.

Autogamy. The process under which a flower becomes fertile without the participation of other flowers.

Avens. This name is applied to the Geums generally, which see. The Water Avens is Geum rivale. The name " Mountain Avens " is used in connection with Dryas octopetala, which see.

Axil, Axillary. The axil of a leaf is the angle between the leaf-stalk and the stem from which it springs.

Azalea (a-za-lea. Ord. Ericaceæ). The Azalea is one of the most brilliant of early-flowering plants. It is valuable for the flower garden, and also for the greenhouse or conservatory.

Imported Azaleas. Culture as pot plants is made simple by the skill of Belgian gardeners, who specialise Azaleas just as Dutchmen do Hyacinths. Instead of a bulb, however, they send a plant on a clean stem a few inches long, the head of which is well set with flower-buds. There is a recognised special trade in these Belgian Azaleas. The amateur who buys them through a florist or bulb-dealer in autumn is not asked an exorbitant price. He places the plants in a mildly heated house, waters them when the pots ring hollow, and sees them gradually break into a sheet of glowing bloom. These little standard Azaleas are very useful for relieving the uniformity of a flat stageful of dwarf bulbs or other plants, and they can be brought into rooms for special occasions. A person with command of two or more greenhouses can have a succession of bloom by forcing some of them in greater heat than the others. After flowering, the bloom should be pinched off carefully to avoid injuring the growth, and the plants will grow on and make leaves. They may be stood outdoors in summer, and watered as required, when they will set a fresh lot of flower-buds.

Compost. 3 parts peat, 1 part loam, and a good sprinkling of sand.

Propagation. Young shoots may be removed as cuttings and struck in sandy peat under a bell-glass in bottom heat. Grafting is done in the nurseries.

For Pots. Good varieties of the Indian and Chinese sections are the best for pots.

For Gardens. There is nothing to excel the hybrid Ghent (American) and mollis (sinensis) Azaleas, single and double, which make glorious groups. The beautiful colonies of yellow, salmon, orange and other vivid shades are familiar at Kew and in other large gardens in late spring. They are grown to the best advantage in full sun, but with shelter from adjoining trees or shrubs. They like a peaty soil, or loam with plenty of leafmould, but dislike lime. Special varieties may be increased by layering in spring.

Species. The species are rarely grown in view of the large number of splendid garden forms available, but every now and then a modern introduction arouses the interest of specialists. The handsome Japanese species Benekirin, with semi-double salmon-coloured flowers spotted with crimson, is a case in point.

Plant garden Azaleas in autumn or spring.

B

Babiana (bab-i-ā-na. Ord. Irideæ). Pretty bulbs, related to the Ixias (which see) and suited by the same treatment. They grow about a foot high, and may be used either for the greenhouse or border. Ringens, scarlet; and stricta, blue and white, with the varieties of the latter, are the most popular.

Bachelor's Buttons. This popular name is applied both to the double Buttercup (Ranunculus acris, flore pleno), and the Red Campion (Lychnis dioica or diurna).

Bacteria. These minute organisms play an important part in plant-life as well as in animal life. Some are beneficial, others injurious. Probably the balance is on the right side, because by oxidising ammonia into nitric acid, bacteria make nitrogen available for plants. They are grouped into round (coccus), short-rod (bacterium), long-rod (bacillus), spiral (vibrio), and filamentous (leptothrix). See a modern work on micro-organisms.

Baeria coronaria. See remarks under Shortia.

Balm. This aromatic herb (Melissa officinalis) makes a cooling drink and is often used as a " tea " for invalids. It thrives in ordinary soil. Propagation is by division in spring or autumn. There is an attractive variegated form. The " Balm of Gilead " of Scripture was probably the resin of a Balsamodendron, but the same name is sometimes applied to Cedronella triphylla, the bruised leaves of which are aromatic. The Bee Balm is Monarda.

Balm of Gilead. See Cedronella triphylla.

Balsam. The double Camellia-flowered and Rose-flowered Balsams of seedsmen, so largely grown in pots as half-hardy annuals, are forms of Impatiens Balsamina. When well grown in 5-in. or 6-in. pots they are very handsome. Seed may be sown in gentle heat in spring and the seedlings set out and potted as needed. Sandy loam, with a little leafmould, suits them. They must be abundantly yet carefully watered, testing by frequent rapping of the pot.

Bambusa, Bamboo (bambū-sa. Ord. Gramineæ). There are three great genera of Bamboos: Arundinaria, Bambusa, and Phyllostachys. The Bamboos are graceful plants, and do well outdoors in sheltered places in northern climes, especially if the soil is peaty. They do not thrive if exposed to cold winds. They may be propagated by division.

Species of Bambusa. Arundinacea, aurea, nana, palmata, pygmaea, and tessellata. Japonica and metake, sometimes grown as Bambusas, are both called Arundinaria japonica by modern botanists. Similarly, B. Simoni is called Arundinaria Simoni, and B. viridi-glaucescens is called Phyllostachys viridi-glaucescens. See also Arundinaria and Phyllostachys.

Baneberry. See Actaea.

Baptisia (bap-tĭs-ia. Ord. Leguminosæ). Hardy perennials, of which Australis, growing 4 ft. high, with purplish, blue-keeled flowers in early summer, is the best species. It is worth growing in a large border, and thrives in most well-drained friable soils. Propagation is by seed sown outside in spring, or by division in spring.

Barbarea (bar-bā-rea. Ord. Cruciferæ). The native B. praecox yields the so-called American Cress for winter salads if seed is sown successionally in shallow drills in August and September and the seedlings thinned. B. vulgaris flore pleno is the double yellow Rocket, the variegated form of which is sometimes grown on the rockery.

Barberry. See Berberis.

Barrenwort. See Epimedium.

Bartonia (bar-tō-nia. Ord. Loasaceæ). The brilliant yellow Californian annual, resembling a St. John's Wort, which seedsmen sell under the name Bartonia aurea, is the Mentzelia Lindleyi of botanists. It is a showy plant, and will thrive in most soils if sown outside in spring and the seedlings thinned to a foot apart.

Basic Slag. A product of ironworks. When very finely ground it is a useful phosphatic fertiliser, particularly for grass land on soils lacking lime. It encourages the growth of clover and should not be used on bowling-greens or other games-grounds. About half a ton per acre is a suitable quantity to apply, preferably in autumn or winter.

Basil. The ordinary or Sweet Basil is Ocymum Basilicum. Ord. Labiatæ. The dried leaves are used for flavouring. Being tender, it should be raised from seed sown under glass in spring and planted out in June after being hardened in a frame. Bush Basil (O. minimum), a dwarfer plant, may be grown in the same way.

Bass (Bast). An old-fashioned protecting material, the fibres of which were much used for tying in past years, but are now superseded by raffia. Bass-mats (Archangel mats) are useful for protecting garden frames. In botany, bast is growing substance—in two sections: the hard bast and the soft bast. See a modern book on Botany.

Basswood or Whitewood. The American Lime, Tilia americana, which see.

Bastard-trenching. A tillage operation under which, in digging, the soil is moved to approximately twice the depth of the spade or fork without the subsoil being brought to the top. Bastard-trenching is most important in breaking up new land, the subsoil of which may be less fertile than the top soil. After a year or two of bastard-trenching, true trenching may be done; in this operation the subsoil (now improved) comes to the top.

Bay-Laurel or **Bay-tree.** See Laurus nobilis. It is different from the garden or Cherry Laurel (see Laurel).

Bead-plant. See Nertera.

Beam, white. Pyrus Aria, a good small tree for chalk, and capable of enduring exposure to cold winds. See also Pyrus.

Bean. In its different species, which vary greatly, the Bean is one of the most esteemed of vegetables. The Broad Bean (Faba vulgaris) is hardy, but the dwarf Kidney Bean (Phaseolus vulgaris) is not, and the Scarlet Runner (Phaseolus multiflorus) still less so. Both of the latter are perhaps more valuable than the Broad Bean,

certainly the Runner is, as in addition to more delicate flavour it crops much longer, lasting well into the autumn if frost permits.

Soil. All the Beans like a deep, well-manured soil. In garden rotations, it pays to concentrate tillage and manure on ground for Peas and Beans, changing the site every year, because a good crop of roots can be grown the next season without more manure.

Sowing Broad Beans. The Broad Bean may be sown in November or March, the seeds being set 9 ins. apart either in single or double rows. One pint of Longpod seed will sow 75 ft. of double row at 9 ins. apart. Or seeds may be sown in deep boxes in February and the plants set when 6 ins. high.

Enemies. Broad Beans are subject to black Aphis and weevil, and the former alone is formidable enough to dishearten all but the most determined grower, especially when the plants are held back by drought. Experience teaches that the enemy can be mastered provided the plants can be got to, say, 2 ft. high by the beginning of June, either by sowing in autumn or winter or as early as possible in spring, because with the plants well in bloom by the time the aphis appears, the pinching off of the tops, followed by an occasional rubbing-over of the tips with finger and thumb (gardeners are not a squeamish class), will subdue it. Happily the insect works from the top downwards, not from the bottom upwards, hence the efficacy of topping. Syringing with an insecticide may help the grower, but it is not in itself the proper remedy. The soot-and-lime remedy mentioned under Peas is the best for weevil.

Staking. The plants will not require separate sticks, but if the row is in an exposed place it may be well to drive in stakes every 8 ft., and run two tiers of strong string along as a support. There are two classes, Longpod and Windsor, and there are white- and green-seeded sections of each.

Sowing Dwarf French Beans. Sow at the end of April, dropping the seeds singly 6 to 9 ins. apart, and covering 3 ins. deep. If very strong growth follows in rich soil the plants may be thinned. One pint of seed will sow 400 ft. of row with seeds 9 ins. apart. This Bean likes moist, fertile soil in a sheltered place. The crop must be picked regularly while the pods are young, or it will be over quickly. Large varieties may have the rows 2 ft. apart; small, 18 ins. If slugs give trouble hoe freely and dust lime about at night. See also Slugs.

The Scarlet Runner. This is the most useful of all the Beans, and in rich, moist soil, and with regular picking, it will keep on bearing for three months. In hot, dry soil it often falls a prey to red spider. Early crops may be had by sowing seed in deep boxes under glass in March and planting in June; or by wintering old roots in boxes and planting out in June. It is rarely safe to sow seed out of doors before mid-May. The seeds may be set 1 ft. apart, and each plant given an 8-ft. pole. With the seeds at 1 ft. apart 1 pint will sow about 180 ft. of row. Soakings of liquid manure and a mulching of short manure will help the plants to bear a continuous supply of succulent pods. If there is a difficulty in staking, the twiners may be nipped off as fast as they show and the plants kept dwarf. Should slugs attack any plants scatter lawn mowings about, and dust with powdered lime at night. See also Slugs.

Use of Glass for Beans. In spring any light house with or without heat will be serviceable for starting Scarlet Runners. The seeds may be put 6 ins. apart in boxes of soil early in May, and if plenty of air is given and the plants are kept near the glass, a fine sturdy batch will be available for planting any time after the middle of May. They will take no harm if kept in the boxes until June, thus perhaps facilitating taking an early crop, such as Turnips and Lettuces, from the ground which they are to occupy. Dwarf French Beans may be grown from seedling stage to maturity in any light, warm, airy house. Large pots or boxes may be used and a few forked sticks employed to support the stems. A crop of a climbing French Bean, such as Tender and True or Princess of Wales, can be grown in a large airy house by sowing to succeed Tomatoes in late summer. The varieties named bear prodigiously.

Bean Tree. See Ceratonia.

Bearberry. See Arctostaphylos.

Bearbind. This is Calystegia sepium. Its beauty when rambling in a semi-wild place may be admitted, but it should be rigorously kept under control in the garden, or it may become a tiresome weed.

Bear's Breech. See Acanthus.

Bear's-ear. See Auricula.

BEDS AND BEDDING-OUT

In modern flower-gardening, importance is rightly attached to herbaceous borders and rockeries, yet freed from the error of the past, flower-beds still have their value.

There is possibly no branch of gardening in which there has been so painful a want of restraint, good taste, and regard for reasonable economy as in what is generally called "bedding." In planning bedding, therefore, for the future it behoves public and private gardener alike to break resolutely with the past and adopt more artistic and more economical methods. In particular, elaborate lawn beds—"star" beds, "ribbon" beds, "scroll" beds, "Cucumber-seed" beds, "bunches-of-Grapes" beds, "diamond-and-circle" beds—involve an enormous amount of labour, not alone in planting but in edge-dressing after mowing.

Lawn beds should be simple in design, beauty being sought in the plants put in them, chosen for harmonies of colour.

Whatever other things may remain in doubt, there can be none about this—that the interest of a bed or group of beds should be in the contents, and consequently, that no fanciful shapes are called for. Beds on the edges of the lawn, curving rhythmically to its outline, are almost invariably more effective than grouped beds on the body thereof.

Wallflowers and Tulips. These are perfect complements, whether in lawn beds or border-groups. Whoso wants to realise the best that marvellous yellow Tulips like Mrs. Moon and Gesneriana lutea can give should group them with Wallflower Cloth of Gold. And they should put a flame Tulip like Thomas Moore with Wallflower Fire King; the crimson Pride of Haarlem, or Caledonia, or a maroon like Leonardo da Vinci, with Wallflower Blood Red. But that is

not all. They can provide quaint and fascinating harmonies by associating such a Tulip as Erguste or Rev. H. Ewbank with Wallflower Ruby Gem; White Swan with Wallflower Ivory White; Walter T. Ware with Wallflower Primrose Dame; Loveliness with Wallflower Eastern Queen. Granted that beds of Wallflowers alone make a brilliant display on a May day, do they not tend to pall? Any way, increased interest will be found in groups artistically blended for colour.

Carpeting. This grouping system with Tulips and Wallflowers is heightened in effect if a carpeting of Arabises and Aubrietias is employed. Where the area is restricted, semi-late, semi-tall Tulips like Le Rêve, Loveliness, Thomas Moore, La Merveille, and the exquisite Clara Butt may be used more freely than giants like Pride of Haarlem, Gesneriana lutea, and G. major; and they may be nested in broad cushions of Aubrietia. In borders, alternate groups of Wallflowers and the larger Tulips at the back, harmonised or contrasted as to colour, will complete the picture. On sunny days in early May, when the ruddy stems of Paeonies and the ferny green of Pyrethrums are upspringing between Tulips and Wallflowers, the border will have a charm and beauty that the most precious gift of summer can hardly match.

Daisies, Forget-me-nots, Alyssum saxatile compactum, Alpine Auriculas, Primroses in colour, Polyanthuses, the invaluable double white Arabis, and other dwarf spring bloomers, which can be easily and cheaply raised from seeds or cuttings, may also be used for carpeting clusters of Tulips, which of all spring flowers are the most beautiful when they are given suitable associates and yet are so vulgar when misused.

Summer Carpeting. The same principle of adopting soft-toned groundwork plants ought to be carried out in summer in those cases, limited in number, where groups of beds have to be used. Here London Pride, the smaller fibrous-rooted Begonias, Thrift, Alyssum Little Dorrit, or variegated and lightsome Grasses such as Eulalia japonica, Panicum virgatum, striped Zeas (for large beds), and Dactylis elegantissima may be used with advantage to soften the often too garish bedders.

A distinct and beautiful effect is produced by planting orange and salmon Antirrhinums or Nemesias under Rose Madame E. Herriot.

One or two forceful subjects may stand alone in order to throw into relief the more subdued themes: for example, the glowing Salvia Pride of Zürich and the king of Zonal Geraniums, Paul Crampel. There is an elemental power and vigour about these plants that cannot be curbed.

Summer Bedders. Tuberous Begonias, especially single varieties in mixture with pinks, whites, and yellows strongly represented among them, need no associates; unfortunately, many places are too dry for them. Verbenas, too, have the requisite softness of tone to stand alone. Carnations are admirable bedders, with or without a groundwork of Violas. Other suggestions are given in the following tables.

First Plant	*Second Plant or Groundwork*	*Remarks*
Brompton Stocks	Alyssum saxatile and mauve Aubrietias	The Stocks may be sown outside in June and transferred to the bed in autumn, 2 ft. apart. The other plants may be sown in spring and planted alternately a foot apart in autumn
Auriculas	London Pride	The strong Auriculas sold by seedsmen as mixed Alpine are the best; they can be raised from seed sown as soon as ripe; plant a foot apart. Use the London Pride merely as an edging
Funkia, variegated	Tall scarlet Tulip	The respective plants may be set in groups 3 ft. apart. The bed may be edged with the lovely blue Scilla sibirica if desired
Rose Tulips	Yellow Wallflowers	Clara Butt will do admirably for the Tulip and Golden Tom Thumb for the Wallflower; set in groups. Carpet and edge broadly with deep blue Forget-me-nots
Scarlet Anemones	Double white Arabis	Raise a stock of Anemone fulgens from seed in spring or buy tubers in autumn. The Arabis can be raised from side shoots in early summer. Plant alternately a foot apart
Red Wallflowers	Narcissus Sir Watkin	Plant the Daffodils a foot apart all over the bed and set the Wallflowers 1½ ft. apart amongst them
Scilla campanulata	Arabis and Double Daisies	Plant the Scillas a foot apart and 6 ins. deep in autumn, the Arabis as a groundwork and pink and white Daisies as a broad band round the margin

First Plant	*Second Plant or Groundwork*	*Remarks*
Kochia tricophylla	Tall scarlet Nasturtiums—Alyssum	Raise the Kochias and Nasturtiums from seed in spring. If variegated Alyssum (Königa) is used, raise from cuttings in winter
Marguerite Mrs. Sander	Gladiolus brenchleyensis — Pentstemon Newbury Gem	Raise the Marguerites from cuttings in spring. Buy bulbs of the Gladiolus in spring. Plant all 18 ins. apart in late spring. Raise the Pentstemons from cuttings in autumn, winter in a frame, and plant as a broad outer band
Nemesia strumosa	Sweet Alyssum	Raise the Nemesias in a frame in spring and plant a foot apart in May. Sow the Alyssum outside as an edging. Or Virginian Stock may be used instead
Margaret Carnations	Indian Pinks	Raise both plants from seed under glass in February and plant in May
Statice Suworowi	Lobelia tenuior	Raise both plants from seed under glass in February. Plant the Statice 18 ins. apart on a groundwork of the Lobelia
Verbenas	Anthericum variegatum	Raise the Verbenas from seed under glass in February and plant out 18 ins. apart in June, with the Anthericum dotted amongst them. It is a tender evergreen propagated by division and must be wintered under glass in heat. The bed may be edged with variegated Alyssum or Echeverias at will
Geranium Paul Crampel	Snapdragons	White or yellow Snapdragons may be associated with the Geraniums at will. All raised from cuttings.
Zinnias	Tagetes signata pumila	Raise both plants under glass in February. Plant the Zinnias 18 ins. apart and use the Tagetes as a broad outer band

First Plant	*Second Plant or Groundwork*	*Remarks*
Anchusa Dropmore variety	Godetia double rose	Raise the Anchusa from seed or from root cuttings in spring and plant out 4 ft. apart in May. Sow the Godetia outside to form a broad border
Ostrich Plume or Comet Asters	Salpiglossis	Raise both plants in a frame in March and plant 18 ins. apart in mixture in May or June. The Asters also look well with Nicotiana Sanderae instead of Salpiglossis
Sweet William Pink Beauty	White Viola	Raise the Sweet William from seed in June and plant out the following spring on a groundwork of the Viola, which can be raised from cuttings in autumn
Ivy-leaved Geranium Galilee or Madame Crousse orScarletCrousse	Blue Ageratum	Raise the Geraniums from cuttings in summer and plant out the following June. Raise the Ageratums from seed in a frame in February and plant as a broad edging
Heliotrope, pale	Mauve Viola	Plant a Viola such as Maggie Mott a foot apart in spring and set the Heliotropes among them in June

When two or more different kinds of plants are associated in the same bed there is always a risk of an incongruous effect. The examples given avoid that mistake and give the planter a guide in the many other associations which may be thought out. At the same time, he will do well to think of such plants as Carnations and tuberous Begonias, which look well by themselves. And in his permanent beds, as of Roses, he may do well to remember the charm of Violas as groundwork, especially the white and lavender varieties.

Although the Zonal Geranium is still an immensely popular plant, as the great cultures in the nurseries prove, it is not bedded in the large gardens and parks so much as it used to be. Certainly we do not see in private gardens fancy arrangements of the varieties with coloured leaves which were once so popular. But we do see Zonal varieties like Paul Crampel, which have brilliant flowers and green leaves, in suburban gardens, where Geraniums appear to be as popular as they ever were. In large private gardens the use

of the brilliant Zonals is almost entirely restricted to tubs and vases. They have a place on steps and terraces, where they give a cheerful glow of vivid colour against grey stone or time-stained masonry.

Bedeguar. Rose-growers sometimes find reddish moss-like galls on their Roses or Sweetbrier. The galls are caused by the grubs of Cynips Bedegaris, a small insect which lays eggs in the buds of the young shoots, the feeding of the grubs which hatch therefrom setting up an irritation which results in the galls. Unless very numerous they may be ignored, as they are not unsightly or injurious.

Beech. The Beech, Fagus sylvatica (see also Fagus), is one of the best of British timber trees for chalky soil, and should be a first choice for such ground. This is not to say that it disdains loamy and even clay soils, provided they are not very damp; it will, in fact, thrive in most well-drained soils. It makes a handsome park or woodland tree, but is too large for small gardens, where the weeping form is more appropriate; or where, perhaps, room can be found for the Copper Beech or the Purple Beech, both of which are varieties of it. There are many other varieties of Beech, some with lobed leaves, others variegated. Propagation of the species is by seeds, of the varieties by grafting. As the Beech holds its leaves long after it has turned brown it is sometimes planted where a tall hedge is wanted, as it provides shelter most of the winter. Plant in autumn. There is an evergreen species of Beech, Fagus betuloides, but it is not important.

Bees. Should be encouraged by fruit-growers, because of the aid they give in fertilisation. While most fruits (certain varieties of Black Currant excepted) do not actually require the aid of hive bees, it has been noted that there is most fruit near the hives.

Beetroot (Beta vulgaris. Ord. Chenopodiaceæ). With the revival of Beetroot culture for sugar-making, fresh interest has been roused in an old garden vegetable. Beetroot will grow in almost any soil, but does best in rather heavy, moist ground. Little manure is required in such land, and if the crop follows one for which the soil was well manured the previous year, such as Peas, Beans, or Celery (see Beans), none at all.

Sowing. Early sowing results in coarse roots, and it is best to defer it until May. If roots are wanted before September sow a round or globe-shaped variety at mid-April. It economises seed and reduces the labour of thinning to drop three seeds in a cluster at every 9 ins., and these can be reduced to one later on. Cover 2 ins. deep. If sown by sprinkling the seed along a drill, an ounce of seed should be allowed for 75-ft. run. Exhibitors make narrow holes 18 ins. deep, and fill with special compost in order to obtain symmetrical specimens of long Beet, growing one plant in each. Birds must be kept away with tanned fish netting, black thread, or scares. Losses may be made good by transplanting. The rows may be 15 ins. apart.

Storing. In October the leaves should be removed without injury to the crowns, and the roots laid in a heap and covered with sand or with straw and soil. The tops should not be destroyed, but used as manure, inasmuch as they yield potash.

Spinach and Seakale (Silver) Beets. These are varieties respectively

of B. brasiliensis (Brazilian Beet) and B. Cicla. The leaf of the Spinach Beet is cooked like Spinach, and the midribs of Seakale Beet are peeled and used as a substitute for Seakale. In practice one sometimes finds the Spinach and Seakale Beets as bought from seedsmen mixed, but it does not matter much, as both are useful and are suited by the same treatment—sowing outside about mid-April in rows about 18 ins. apart and thinning to 1 ft. in the rows. The larger outside leaves should be pulled progressively, then a continuous supply of tender stuff will be available for many months.

Begonia (be-gō-nia. Ord. Begoniaceæ). This brilliant plant has made great strides in public favour, both for summer and winter blooming. The same kinds are not used for both purposes. Varieties resulting from hybrids between tuberous-rooted species are used for summer flowering, and the offspring of fibrous-rooted species are employed for winter. We see, therefore, that there are two distinct types of Begonia, one of which produces a tuber, and another which does not. Hybrids have now been raised between selected tuberous-rooted varieties and the fibrous-rooted species socotrana, and they are very beautiful. They are semi-tuberous.

Tuberous Begonias. These have sprung from the South American species boliviensis, Clarkei, Davisi, Pearcei, rosaeflora, and Veitchii. They are suitable both for pot and garden cultivation, but they should not be used outdoors in shallow chalky or sandy soils unless the grower is prepared to do a good deal of watering in hot, dry summers. He should also mulch with short manure or cocoa-nut fibre refuse, to check the evaporation of moisture. When the Begonia is to be used as a bedding plant, it is wise to buy mixed tubers and embed them in leafmould in boxes in March. If kept in a frame or greenhouse they will break into growth, and by June will be well advanced. They can then be given a good watering to settle the soil about their roots, and planted out a foot apart. They will probably be at their best in October, unless early frosts check them. When they are over they may be lifted, the tubers dried and stored in fine sawdust for the winter. Named varieties may be chosen for pots if desired, but mixed tubers are cheaper. They may be potted in 5-in. pots in February or March, and brought on steadily in a greenhouse.

Compost for pots. 3 parts fibrous loam, 1 part leafmould or decayed manure, and enough sand to make the mixture gritty.

Propagation. Any good variety can be propagated by striking cuttings of the young shoots in sandy soil, or the tubers may be cut in halves the following spring. But tuberous Begonias can be flowered the same year from seed if there is heat available for it to be sown in winter. The seed is snuff-like, and a very fine surface must be prepared for it. The pan should be shaded with glass and paper until the seeds germinate. The seedlings will require careful watering and handling at the first pricking off. They will grow slowly until their tubers are formed, then much faster.

Winter-bloomers. The beautiful pink Gloire de Lorraine, which has pretty foliage as well as abundance of flowers, is still one of the best. The habit of this splendid plant is one of its chief charms, making it suitable for a hanging basket. It thrives in a temperature of 55° to 65° in winter, and when in bloom may be kept somewhat

cooler. After it has bloomed it may be gradually dried off, pruned back to short stumps, and rested. With fresh watering and syringing in summer shoots will push, and these may be taken off at 3 ins. long and struck as cuttings. Another method of propagation is to take mature leaves before drying off, lightly nick the ribs, and lay them on the surface of the soil, when roots should form. Plants from leaves come somewhat more compact than those from cuttings, and bloom later. While in full growth, much water and a moist atmosphere are good for Gloire de Lorraine. It is beautiful under artificial light. Masterpiece is a deeper pink. Turnford Hall is a good white form, and alba grandiflora another. Other beautiful winter-flowering Begonias are Gloire de Sceaux, which has handsome brownish leaves and pink flowers; and weltoniensis, with pink flowers. Gloire de Sceaux is a grand hybrid. It may be propagated by cuttings from the base in March, and the house should be fumigated every three weeks to keep down the mite which attacks it. It lasts in bloom many weeks.

Foliage Begonias. Rex and decora are good. The former is a popular window plant.

Small Bedders. Several forms of the fibrous-rooted Begonia semperflorens are now available, and are charming for beds and edgings.

Enemies. Begonia leaves are sometimes disfigured by a mite or by thrips. Dipping the plants two or three times at ten-day intervals in a nicotine-soap wash will kill both insects and eggs.

Belladonna Lily. See Amaryllis.

Bellflower. See Campanula.

Bell-glass. A dome-shaped glass, fitted with a knob, and made in various sizes, used for covering cuttings to exclude air till rooting has taken place. See also Cloches

Bellis, Daisy (bĕll-is. Ord. Compositæ). The garden Daisies, varieties of Bellis perennis, are esteemed for spring flowering. They are low growers, but produce large, bright flowers. The Hen-and-chicken is a curious variety, producing small secondary flowers. The giant double white, pink, and red Daisies may be sown in June and planted in autumn in ordinary garden soil, either as carpets or borders for beds. If desired they may be propagated by division after flowering, but most people raise fresh plants annually.

Bellium (bĕll-i-um. Ord. Compositæ). Daisy-like plants, of which bellidioides, an annual with white flowers in summer, 4 ins. high; and minimum, white and yellow flowers in summer, 3 ins. high, are the only ones much grown. They may be raised from seed, if obtainable, in a greenhouse in spring; or plants may be bought. Ordinary soil.

Berberidopsis (bĕrber-i-dŏp-sis. Ord. Berberideæ). The only species grown, corallina, is a handsome evergreen rambling shrub. It bears crimson flowers at the ends of the branches in spring. It is not very particular as to soil, but likes a mild, sheltered place, not being hardy. It may be propagated by cuttings of young wood in spring, or by layering the branches in autumn.

Berberis, Barberry (bĕr-beris. Ord. Berberideæ). Extremely valuable and beautiful shrubs, particularly the evergreen species, most of which have handsome foliage as well as pretty flowers. Buxifolia nana, a dwarf evergreen, has small dark oval leaves. In Darwini, orange; and stenophylla, yellow (the latter, a hybrid, forms a charming

hedge at Kew), the branches are clothed with bloom from base to tip in spring. Of newer evergreen species, Julianae, Sargentiana, and Veitchii, all yellow-flowered with black fruits, may be noted. The common deciduous species, vulgaris (Barberry), has handsome fruit, which is sometimes preserved. There is a purple-leaved form of it. Good newer deciduous kinds are Wilsoni, yellow flowers and red fruit; brachypoda Gibbsii, yellow tassels and red fruit; and Thunbergii atropurpurea, red foliage. Aquifolium, often grown under the older name of Mahonia aquifolia, is a useful shrub, as it grows almost anywhere, is evergreen, and bears purplish fruit. Aldenhamensis, Vicarii and Moserii are fine forms of it. It is particularly valuable for a shady place. Darwini thrives by the sea, but none the less gives of its best when sheltered from cutting winds.

Propagation. By suckers or cuttings of ripe wood in autumn.

Bergamot. A name sometimes given to Monarda didyma, whose leaves, when lightly rubbed, give a bergamot-like odour. It grows 2 to 3 ft. high, has red flowers (bracts) in late summer, and may be grown as an ordinary herbaceous plant. The form Cambridge Scarlet is very good. The true Bergamot is a very different plant—Citrus aurantium Bergamo.

Berry. A fruit in which seeds are embedded in pulp, e.g. Gooseberry.

Beta. See Beet. Beta Cicla, or Ornamental Chilian Beet, is sometimes used for the flower garden, owing to the rich colour of the leaves.

Betonica grandiflora. See Stachys grandiflora. S. Betonica is the Wood Betony, once used medicinally as a "tea."

Betula, Birch (bĕt-ula. Ord. Cupuliferæ). The common or Silver Birch, Betula alba, is a graceful tree, worth planting in parks and on the outskirts of gardens. There are a good many forms of it, such as weeping (pendula), a cut-leaved weeping (laciniata pendula), a dark-leaved (purpurea), and a variegated-leaved (foliis-variegatis). They will grow in most soils if planted in autumn. Nice trees of the Silver Birch can be bought with long, straight stems and pyramidal heads at a low cost. It will thrive very well on poor soil, such as shallow chalk. There are many other species. Among newer kinds may be named Delavayi, orange bark; Ermanii, cream trunk; and japonica and its forms with silvery bark.

BIENNIALS: CULTIVATION AND SELECTIONS

Biennial plants are those which complete their life-cycle in the second year from germination. Sown one year they bloom and ripen their seed the next. Several hardy biennials are of the utmost value in the flower garden, and the fragrant Wallflower stands out prominently as an indispensable plant that is best treated as a biennial. The Sweet William is another useful old plant that thrives with treatment as a hardy biennial. If there were only these two the section would be important, but, as the following table shows, there are several others of considerable importance. The best method of treatment for hardy biennials is to sow the seed in well-pulverised soil in drills drawn a foot apart in May or June, thin, hoe, set out a few inches apart in a spare bed in July, and plant in beds and borders in autumn. When treated thus they are strong and sturdy, transplant well in showery weather, branch freely, and bear a long succession of flowers.

Name	*Feet High*	*Colour*
Adlumia cirrhosa	Rambler	Flesh
Androsace lactiflora	½	White
Aster Bigelovii	2	Lilac
Campanula pyramidalis	4 to 6	Blue
,, ,, alba	4 to 6	White
Canterbury Bell	2½	Blue, rose, white
,, ,, Cup and Saucer	2½	Blue, white
Foxglove (Digitalis)	6 to 10	Various
Gilia aggregata	¾	Scarlet
Indian Pink (Dianthus chinensis, Heddewigii, etc.)	¾	Various
Michauxia campanuloides	4	White
Poppy, Iceland	1	Various
,, Sunbeam	1	,,
Stock, Brompton	2	,,
Sweet Rocket	2	Purple, white
Sweet William	1	Various
Verbascum olympicum	4	Yellow
Wallflower	1½	Red, yellow, brown, etc.

The Dianthuses are often treated as annuals. Antirrhinums (Snapdragons) and Pentstemons are admirable when sown in boxes in autumn, and wintered in frames to flower the following year, thus proving their worth as biennials. Wallflowers should be sown later than most other biennials if the soil is deep and rich, otherwise they will become too large for convenient transplantation. Wallflowers and Snapdragons will thrive in most soils, but they are the best of all hardy biennials for poor limestone.

Bignonia (big-nō-nia. Ord. Bignoniaceæ). Brilliant hothouse climbers with compound leaves, well suited to train up the pillars or roof of a greenhouse or conservatory. Fibrous loam and peat in equal parts, with sand, suit. They are propagated by cuttings of half-ripe side shoots kept close in heat; also by seed and layers. The principal species are magnifica, with purplish-crimson flowers; speciosa or picta, pink; Tweediana, yellow; and venusta, orange. Capreolata, which has scarlet flowers, may be grown outdoors in mild, sheltered places. This species may be increased by root cuttings. Bignonia radicans, which has orange flowers, is now called Tecoma radicans by botanists.

Bilberry. This is the Vaccinium Myrtillus of botanists, a dwarf hardy British shrub bearing pink flowers in spring. Its dark blue berries are edible. It is also called the Blaeberry or Whortleberry. The Cranberry is Oxycoccus palustris.

Bilbergia (bĭll-bĕr-gia. Ord. Bromeliaceæ). Hothouse plants with thick, fleshy leaves crowded on a short stem, and dense heads of brilliant bloom. They thrive in equal parts of loam and peat, with a little decayed manure and a good sprinkling of sand. Propagation

is by suckers. Moreli, blue and rose; thyrsoidea, scarlet; and vittata, green, red, and violet, are three of the best-known species. All bloom in autumn or winter.

Bindweed. Like the Bearbind, this plant, as a Convolvulus, has real claims to beauty, but may become a weed, and when it once gets the upper hand in a garden it becomes a serious nuisance. Ground infested with it should be dug with a fork, to avoid cutting up the underground stems, which should be shaken out and burned.

The Small or Lesser Bindweed, Convolvulus arvensis, may establish itself in turf, and become objectionable on lawns. The point should be remembered when turf is being procured for this purpose.

Biota. The two Conifers sometimes grown as B. orientalis and B. pendula are respectively a species and variety of Thuya—T. orientalis (Chinese Arbor Vitae) and T. orientalis pendula. See Thuya.

Birch. A familiar tree, the male organs of which consist of catkins at the apex, while the female are small and axillary. Some remarks on the best forms will be found under Betula.

Bird Cherry. This is one of the most beautiful of spring-flowering trees, with its abundant racemes of white flowers, and is grown extensively in standard form by nurserymen for sale at a moderate price. Whenever a selection of smallish spring-flowering trees is being made the Bird Cherry (Prunus Padus) should be included. It thrives in most fertile, well-drained soils. Plant in autumn if possible and give each tree a strong stake. There are many varieties, including a double.

Birds. Although birds do damage to various crops, they are in the main friends of the gardener, through destroying large numbers of caterpillars, grubs, and insects. Tits, swallows, robins, thrushes, starlings, wrens, flycatchers, whitethroats, cuckoos, and redstarts are mainly (in some cases wholly) insectivorous. The most damage is done to crops by blackbirds, thrushes, starlings, finches, and house sparrows. Seedlings and fruit must be protected with thread, netting, and scares. The balance of Nature should not be interfered with, and birds of prey, such as owls and hawks, should be preserved equally with song-birds.

Bird's-eye Primrose. See Primula farinosa.

Bird's-nest Fern. See Asplenium nidus.

Birthwort. See Aristolochia.

Bitter Almond. See Almond.

Bitter Vetch. See Orobus.

Blackberry. The Bramble, Bumblekites or Blackberry (Rubus fruticosus of botanists) is a well-known native plant, the fruit of which is much sought after in late summer for stewing purposes, and also for making jelly. The improved varieties are well worth growing in gardens where the soil is deep, fertile, and moist; but they are of little use in dry shallow soils. As they are often shy in starting, it is wise to adopt the plan generally practised with Raspberries, and prune them back hard at planting time in autumn. This generally induces them to break from below. Thereafter they can be kept in order by thinning out old fruited wood. If more are wanted they can be obtained by bending the canes over and pegging down the tips in late summer, or by dividing the stools in autumn.

Parsley-leaved is a good variety, with large, richly-flavoured fruit. It can be grown over a rustic fence or trellis.

Black Dolphin. See remarks under Beans (Broad).

Black Fly. See remarks under Aphides.

Black Hellebore. See Christmas Rose (Helleborus niger).

Black Maidenhair or Spleenwort. See Asplenium.

Bladder Fern. See Cystopteris.

Bladder Nut. See Staphylea.

Bladder Senna. See Colutea.

Bladderwort. See Utricularia.

Blandfordia (bland-fōr-dia. Ord. Liliaceæ). Pretty semi-bulbous plants, suitable for the greenhouse. They are propagated by offsets and thrive in a compost of fibrous loam, with leafmould and sand. The flowers are drooping and funnel-shaped. Grandiflora (Cunninghami), with crimson flowers in summer; and flammea aurea, yellow, summer, are two of the best. Both grow about 18 ins. high.

Blechnum (blĕc-num. Ord. Filices). A large genus of ferns, allied to Lomaria. The popular species Spicant is now called by botanists Lomaria Spicant. It is a British plant, and will therefore thrive outdoors in northern climes, but it is worth growing in pots for the cool greenhouse. For culture, see Ferns.

Bleeding. A gardener's term for exudation of sap, following injury or pruning. Vines pruned while growing are apt to suffer. Florists sell a styptic for application to the wound, but cultivators aim at avoiding the necessity for extraneous dressings by timely pruning and proper treatment. See Grapes.

Bleeding Heart. A popular name for the beautiful plant Dicentra (or Dielytra) spectabilis, which see. In the west country it is also applied to the dark Wallflower.

Blight. A common term for a severe attack on a particular plant by a fungus or insect, or for the fungus or insect itself: e.g. American Blight. The principal enemies of crops are dealt with separately under each crop in this work.

Blood as Manure. See Manures.

Bloodroot, Bloodwort. See Sanguinaria.

Bloom, Blossom. These names are popularly applied to flowers. Bloom is also used to describe the down-like covering on the skins of Grapes and other fruits. While " bloom " is used generally as an alternative for flowers, " blossom " is usually reserved for the inflorescence of fruit trees.

Bluebell. The English Bluebell is Scilla nutans (see Scilla); the Scotch is Campanula rotundifolia (see Campanula).

Blue-bottle (Centaurea Cyanus, the Cornflower). The French call it Bluets. See Annuals and Centaurea.

Blue Gum Tree. See Eucalyptus Globulus.

Blue Marguerite. See Agathaea and Marguerite.

Bobartia (bo-bār-tia. Ord. Irideæ). The species aurantiaca, 18 ins. high, with orange flowers in summer, is a graceful plant, but needs a sheltered place in the border or a warm spot on the rockery, with friable loamy soil and covering in winter. Or the offsets may be lifted, dried, and stored until spring.

Bocconia, Plume Poppy (boc-cō-nia, Ord. Papaveraceæ). Bocconia cordata is a very handsome hardy herbaceous plant, and in moist,

substantial soil, such as well-worked clay, attains to a height of 4 or 5 ft. The foliage is expansive, and the inflorescence is in the form of a tall spike of buff-coloured flowers. It may be propagated by division in spring. This fine plant is well worth a place in the border. It does not care for dry, shallow soil. B. japonica, with feathery cream-coloured plumes, is also grown.

Bog Bean (Menyanthes trifoliata). See Flower Garden: The Water Garden.

Bog Violet. See Pinguicula.

Boiler. See Greenhouse: Heating.

Bolting. A term used to indicate the running to seed of Cabbages, Celery, Lettuces, etc. It is commonly due to drought, but is a natural process in biennial plants which are grown as annuals, such as Lettuces. See the various crops affected.

Boltonia (bol-tō-nia. Ord. Compositæ). Boltonia asteroides is a vigorous, autumn-flowering, hardy herbaceous plant, with pale pink flowers which might easily be mistaken for Michaelmas Daisies. It grows about 4 ft. high, and spreads freely in most soils. It is easily propagated by division in spring. It is well worth adding to any border, as its foliage is pretty. Staking is desirable. Ordinary soil.

Bones. See Manures. Steamed bone flour is a useful item in almost any mixture of artificial manures.

Borage. The blue-flowered hardy annual Borage, Borago officinalis, is an aromatic plant beloved of bees. The leaves are sometimes used in salads, and for flavouring liquors. It may be raised from seed in spring, and thrives in almost any soil that is not stiff and wet.

Bordeaux Mixture. Modern agricultural science has done no better service than in putting at our disposal certain liquids which destroy the fungus diseases of crops. Of these the most famous is the Bordeaux Mixture, which originated in one of the great wine-growing districts of France, and has been found useful by Potato-growers, Tomato-cultivators, and fruit-growers generally, as well as viti-culturists. It consists of sulphate of copper (" bluestone "), lime, and water. The following are suitable proportions:

For Fruit Trees	*For Potatoes*
8 lb. bluestone	14 lb. bluestone
8 lb. lime	9½ lb. lime
100 gallons of water	100 gallons of water

Fresh white stone (" shell ") lime is important, and as it cannot always be procured when wanted, it is a good plan to make a stock solution of one pound of each ingredient to a gallon of water, and keep it in a closed vessel. When wanted for use the stock solution may be diluted with water till brought to the strength advised above. In preparing the stock solution, first dissolve the pound of bluestone in half a gallon of water in a wooden vessel, then place the fresh lumps of lime in half a gallon of water, and leave both for an hour. Stir the two liquids, and pour them together through a piece of muslin to strain out any lumps. Air-slaked lime is not suitable for making Bordeaux Mixture, as it scorches the foliage of fruit trees. When applying Bordeaux Mixture, use it at the very first sign of an

attack, employing a sprayer which will distribute it in a dew-like state. For Potatoes it should be applied to the under as well as the upper surface of the leaves. One application at the end of June and another at the middle of July suffice as a rule.

Border. See Herbaceous Borders.

Borecole or Kale (Brassica oleracea acephala). The Kales are the hardiest of all Winter Greens, and it is not often that they are injured by frost, however severe. In the few seasons when injury is done a hard winter follows a mild autumn, which kept the plants green and soft too long. The Kales are grown in the same way as Broccoli and Brussels Sprouts, and the remarks made under those heads apply. Early April is a good time to sow. The curled Kales throw out small side shoots from axillary buds in mild spells all through the winter and spring, and these are the edible part. Some are ornamental as well as useful, having coloured foliage. The plants are subject to the attack of the enemies described under Broccoli, and are protected in the same way. Good varieties: Arctic, Asparagus, Scotch Curled, Hearting.

Boronia (bō-rō-nia. Ord. Rutaceæ). New Holland plants with wiry shoots and hair-like roots, which need much care in watering to keep healthy. Given this they are suitable for culture in a greenhouse, and are not only pretty, but fragrant. One species, megastigma, is deliciously sweet; it has brownish flowers. Elatior, with rosy flowers, is also sweet. Heterophylla, with bright rose flowers, is the most showy but the least fragrant. Peat and loam in equal parts, with sand, suit. Propagation is by cuttings of the young shoots inserted in sandy soil under a bell-glass in August.

Bottle Brush. See Callistemon.

Bottom Heat. See Propagator.

Bougainvillea (bōu-gain-vĭll-ea. Ord. Nyctagineæ). The species glabra is a handsome plant of vigorous growth, well adapted for training up the wall of a greenhouse. It blooms profusely, in fact it becomes quite covered with bracts, which are of a lilac-rose shade and of satiny texture. It is best planted out in a border of loamy soil. After flowering it should be kept dry, and in the winter the young shoots may be pruned back to the old wood, and a fresh crop will appear. Blooming in autumn, the Bougainvillea is a very useful plant. It may be propagated by cuttings in sandy soil under a bell-glass.

Bouvardia (bōu-vār-dia. Ord. Rubiaceæ). One of the prettiest of evergreen shrubs, and may be had in bloom in winter. The plants are dwarf and bushy in habit, and may be grown successfully in 5-in. or 6-in. pots in a compost of loam (3 parts), decayed manure or leafmould (1 part), and sand. They can be grown in a frame throughout the summer, or even stood outside, and brought into a warm house in winter. With care in watering (see Watering) and a minimum temperature of 50°, the plants will give their pretty sprays of white or pink, fragrant flowers for a long period. After flowering they may be partially dried off, then cut back hard, and syringed, when they will give plenty of young shoots suitable for cuttings. Pinch young plants to make them bushy.

Propagation. Take pieces of the root and cover them with half an inch of soil; or strike young shoots under a bell-glass in spring.

Box, Buxus (bŭx-ŭs. Ord. Euphorbiaceæ). The species and varieties of Box are hardy evergreens, some of which are used for the shrubbery border, while sempervirens suffruticosa, the common Box edging, is used for bordering beds.

Box Edgings. Box harbours slugs, and likewise impoverishes the soil, but its old-world appearance is in its favour, and causes people to plant it in spite of its drawbacks. It looks particularly appropriate in old Dutch gardens, with Yew hedges and trained trees. When allowed to get scraggy and gappy it is not pleasing. Young rooted pieces should be planted against a straight edge of soil cut down with the spade in spring or autumn, and soil trodden against them. Clipping should be done annually in June.

Box for Shrubberies. Among the species and varieties of Box used for shrubberies may be mentioned japonica and its golden-variegated form aurea; sempervirens myrtifolia, Myrtle-like leaves, with its form argentea, a small, dense bush having cream-edged leaves; s. handsworthiensis, dense, handsome; and s. rosmarinifolia (Rosemary-leaved), of slender habit. The common Box, sempervirens, is not to be despised, for it is a cheap, accommodating, neat shrub which bears clipping and can be shifted at almost any season in showery weather owing to its shallow mat of fibrous roots. It will thrive in shallow soil over chalk. Propagation is by cuttings and layers; the former may be young shoots 6 ins. long inserted in a cool place outdoors in late summer, and layers may be put down in early autumn.

Box Thorn. See Lycium.

Brachycome (brak-ȳc-o-mē. Ord. Compositæ). The species iberidifolia (Swan River Daisy) is a graceful hardy annual with purple flowers, commonly grown in pots. There is a white variety. Sow in a box in spring, prick out, and pot successively. See Annuals, Half-hardy.

Bracts. Small leaves at the base of the flower-stalks. Bracts may be leafy and green, or may be coloured; they are distinct from the flowers.

Bramble. See Blackberry.

Brandy Bottle. The Yellow Water Lily. See Nuphar.

Brassavola (brassa-vō-la. Ord. Orchidaceæ). A genus of Orchids, thriving either in pots, on blocks, or in baskets if given a warm house. Peat and Sphagnum moss should be used for compost. The plant requires a great deal of water while growing, but very little while at rest. Digbyana, green and purple, fringed lip, is the most important species. It has been crossed with Cattleyas, giving the new genus Brassocattleya; and with Laelias, resulting in the genus Brassolaelia. There is even the tri-genus Brassocattlaelia, with rare and expensive members.

Brassia (brăss-ia. Ord. Orchidaceæ). An interesting genus of Orchids, of which the species verrucosa is the most popular. It is suitable for culture in a large, deep Orchid pan in a warm house, and produces its yellow, green, and brown flowers in spring. Being borne on arching spikes, they are very graceful. Peat and Sphagnum moss make a suitable compost. When in growth and bloom regular supplies of water are necessary, but the plants need little while at rest.

Brassica (brăss-ica. Ord. Cruciferæ). This is the generic name for Borecole, Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Colewort, Kohl Rabi, Rape, Savoy, Swede, and Turnip. The Borecole, Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Colewort, and Savoy have all sprung from the wild Cabbage, Brassica oleracea, which grows wild on parts of the seashores of Great Britain. The various crops are dealt with under their own names. See Borecole, etc.

Bravoa (brā-vō-a. Ord. Amaryllideæ). A small genus of half-hardy bulbs, of which the principal species is geminiflora, which produces spikes of orange flowers in July. It may be grown outside in sheltered places, or in pots, using sandy loam.

Breakstone. See Saxifraga.

Breastwood. Fruit-growers generally speak of the summer shoots which spring from the front of the main branches of flat-trained trees as breastwood, but some use the term to indicate small shoots generally, and speak of front shoots as "fore-right" (forthright) shoots. Such frontal shoots on wall trees may be cut out, only the side shoots being trained in, where young wood is wanted, as in Peaches.

Briar or Brier, Common, Sweet, and Penzance. The common Brier, or dog Rose, Rosa canina, is used as a stock for Roses, being taken from the hedges in autumn and budded in summer (see Roses). The Sweetbrier, Rosa rubiginosa, is often used as an inner garden hedge, chiefly on account of the delicious odour which it diffuses after a shower. The Penzance Briers are hybrids, one of the parents of which is the Sweetbrier. They are strong growers in good soil, suitable for pillars, and bear abundance of large brilliant flowers, followed by large scarlet hips. The following are good varieties: Amy Robsart, Anne of Geierstein, Lucy Ashton, Meg Merrilies, and Rose Bradwardine. The Austrian Brier, Rosa lutea, is a pretty plant. There are two well-known forms, the Yellow Austrian and the Copper Austrian. The Persian Yellow is another. Crossed with other types it has given the famous Pernetiana class. See Roses.

Bridgesia spicata. See Ercilla.

Briza, Quaking Grass (brī-za. Ord. Gramineæ). See Annuals. Maxima and minor (the latter also known as minima and gracilis) are both annuals.

Broccoli (Brassica oleracea botrytis). Broccoli is the winter and spring representative of the Cauliflower. It is nominally somewhat coarser and less pure white than the latter, but hardier. Broccolis may be had from October to June inclusive by making a suitable choice of varieties and sowing at different periods; but in mild districts Cauliflowers are preferred to autumn Broccoli. After Christmas Broccolis take precedence of Cauliflowers.

Successions of Broccoli. To get autumn and early winter Broccoli seed should be sown out of doors at the end of March; to get late winter and early spring Broccoli, sowing may be practised at the middle of April; and to get late spring and early summer produce, seed may be sown at the end of April. In all cases the seed should be sown thinly in nursery rows a foot apart. Hoe between the seedlings to keep weeds down. The seed should be sprinkled in very thinly, and the seedlings thinned if they begin to crowd each other.

The seed may be covered with half an inch of soil, and the bed protected with tanned fish netting or black thread, otherwise birds will carry off the young plants.

Planting. Showery weather in June or July should be taken advantage of to plant out 30 ins. apart. Firm, moderately rich soil is desirable. Broccoli and other winter Greens (e.g. Brussels Sprouts, Savoys, and Kales), as well as Cauliflowers, are often planted between strong-haulm Potatoes, with the result that the Greens become drawn and flabby, in which state they are weak and easily injured by frost. One of the following precautions should be taken: (1) to plant between early, small-topped Potatoes only; (2) to set the rows of large Potatoes not less than a yard apart with the express object of accommodating the Greens; (3) to plant only between alternate Potato rows, and draw the tops of the Potatoes which are not intercropped away from the Greens on the other side of them. When the Potatoes are lifted the soil should be rammed hard round the Broccoli. When Broccolis have formed their hearts a leaf should be broken over them and left till they are cut.

Varieties. Veitch's Self-Protecting for early and Leamington for late sowings are good. See also seedsmen's specialities. Many find the purple and white "sprouting" Broccoli useful. They are sometimes called Asparagus Broccoli, the young shoots being picked before the flowers open and cooked like Asparagus.

Enemies. Club-root (Plasmodiophora brassicae); gall-weevil (Ceutorhynchus sulcicollis); and the caterpillars of the Large White, Small White, and Green-banded butterflies attack Broccolis and other Greens. Club-root causes large, ugly excrescences on the stem and roots, checking growth. Where prevalent, fallow a piece of ground specially for the Greens, and lay on a coat of gas lime ½ in. thick. Let this lie six weeks on the surface and then turn it in. Leave the ground another month before planting the Greens. Further, earth up the stems when the plants are half grown to encourage new roots. A modern remedy is to sterilise the soil of the seed bed with mercuric chloride (corrosive sublimate), 1 oz. in 6 gallons of water, but it is very poisonous. Gall-weevil causes small, marble-like swellings, which may be sliced off into a vessel containing a little paraffin when transplanting, and the roots drawn through a puddle of soot, lime, and water. The gas-lime treatment is also efficacious. The best remedy for caterpillars is to hand-pick the first-comers, and then syringe the plants forcibly with water in which a little salt has been stirred.

Snowy Fly (Aleyrodes species) may attack Greens in autumn, rising in clouds when disturbed. Nicotine and soft soap solution is the best remedy. See Nicotine.

Protecting late Broccoli. In cold districts it is common to grow the Broccoli in rows running east and west, and when severe weather approaches, to take soil from the north side of the row and force the plants over to that quarter until they are nearly flat. This prevents the sun striking on the heads while they are frozen, and averts severe injury.

Brodiaea (bro-diæa. Ord. Liliaceæ). Pretty but not popular bulbs, or rather corms. They like a warm place in the border or rockery and friable, well-drained soil. Coccinea, scarlet, tipped green;

californica, rosy-purple, 18 ins.; and grandiflora, violet, 18 ins., are the principal species.

Brome Grass, Bromus. The only species grown in gardens is brizaeformis, a graceful biennial which may be sown in summer for the next year's flowering and dried for winter use. Height 2 ft. Ordinary soil.

Bromelia (brō-mē-lia. Ord. Bromeliaceæ). Handsome herbaceous perennials, requiring a hothouse. Bracteata (now referred by botanists to the genus Aechmea), with pink flowers in September; and Pinguin (Binotii), red flowers in spring, are two of the best species. Loam, with a third of decayed manure and some sand, suits. Propagation is by suckers. The plants ought to be kept on the dry side in winter.

Broom. A name commonly applied to certain species of Cytisus, Genista, and Spartium. The Brooms are very useful owing to their adaptability for light, sandy soils. The early Broom, Cytisus praecox; the Portuguese Broom, C. albus; and the Spanish Broom, Genista hispanica, are all good shrubs. Still more handsome is the beautiful brown and yellow Cytisus scoparius Andreanus. All these are worth planting in beds or shrubberies. The Butcher's Broom is Ruscus aculeatus; it is a good plant to grow under trees.

Broom-rape (Orobanche). A singular parasitic plant which first grows upward and then downward in search of the roots of another plant; having found that its upper part dies. It attacks Broom, Butterbur, Germander, and Wormwood.

Browallia (Brŏw-ăll-ia. Ord. Solanaceæ). The blue species elata, and its white and larger varieties alba and grandiflora, are pretty annuals, growing about 2 ft. high. They are generally grown in pots, but may be used for the garden. For cultivation see Annuals.

Brugmansia. See Datura.

Brussels Sprouts (Brassica oleracea bullata gemmifera). Differing from Borecole, the axillary buds remain practically stemless and form balls. In autumn and winter few green vegetables are more appreciated than Brussels Sprouts, and when well grown a few rows will give a supply for several weeks. When an early crop is wanted seed is sometimes sown in August, but for the principal supply the seed is sown outdoors in the first half of April. The seed and seedlings may be treated similarly to Broccoli (which see) and the same remarks apply. In autumn a few of the leaves should be cropped back to stumps in order to check growth and encourage the production of sprouts; but it must not extend to all the leaves at once, or a good deal of sap will be thrown back on the stems and the resulting shoots will be loose. The top or crown growth should be left intact. Each stem ought to become well clothed with sprouts by mid-autumn, and these can be picked as required. In the case of rich, moist soil, which favours gross growth, the larger varieties, such as Aigburth and Exhibition, should be avoided, and smaller kinds like Dwarf Gem and Northaw Prize selected instead; but for poor ground strong varieties had better be chosen. A Cabbage-Brussels Sprout is now procurable; in addition to the sprouts on the stem the plant produces a Cabbage at the top in place of the loose cluster of leaves which distinguishes the ordinary Brussels Sprout.

Brussels Sprouts are attacked by the same enemies as other members of the Brassica tribe. See remarks under Broccoli.

Bryanthus (bry-ăn-thus. Ord. Ericaceæ). A small genus of Heathworts, suitable for the rockery, where they will thrive in peaty soil. Empetriformis (Phyllodoce empetriformis), purplish-red flowers, 6 ins.; and taxifolius (Phyllodoce caerulea and P. taxiforme), red, 2 ft., are the principal species. Plant in autumn or spring.

Bryophyta. A group of plants, consisting of Liverworts and Mosses, in an early stage of plant evolution. They embrace both sexual and asexual (spore-producing) plants.

Buckbean (Menyanthes trifoliata). See Flower Garden: The Water Garden.

Buckler Fern. See Nephrodium.

Buckthorn. See Rhamnus.

Buckthorn, Sea. Hippophae rhamnoides, which see.

Budding. Both fruit trees (see Apples) and Roses (see Brier and Roses) are propagated by means of budding, the buds being inserted in the stocks in summer, preferably after a shower. Buds are best taken from shoots on the under part of a tree and from the centre of the shoot. By squeezing the bud midwise the pith can be extracted easily. A proper budding-knife, such as seedsmen sell, is desirable, as with the flat tip of the handle the edges of the bark can be raised quickly and without tearing. It is most desirable that the buds should be kept moist before insertion; if they are allowed to get dry they will turn back and shrivel later on. If Roses are budded early they will often make strong shoots the same year, and even bloom; but generally they do not grow till the following spring, when the stocks may be shortened to stumps, to which the young growths may be tied until they have united thoroughly.

Buddleia (bŭdd-lēi-a. Ord. Loganiaceæ). Beautiful shrubs and small trees, in some cases so nearly hardy as to be suitable for planting outdoors in sheltered places. Globosa (capitata) bears its inflorescence in an orange ball in spring, and when well flowered is an interesting and beautiful object. Variabilis and its variety Veitchiana bear long, Lilac-like bunches of rosy lavender-scented flowers in July and August. All these may be planted outdoors. Nanhoensis, low, spreading, rosy mauve; amplissima, violet; and magnifica, mauve, are good modern forms of variabilis. Farreri, silvery foliage and lilac flowers; Forrestii, silvery foliage and creamy flowers, are modern species of doubtful hardiness. They may be propagated by cuttings under a handlight in September. The flowering shoots of Veitchiana should be pruned hard back every year after the flowers fade.

Buds. A study of buds is interesting, and it is important in the case of fruit trees, as it is necessary to know the difference between leaf buds, which are generally thin and conical, and blossom buds, which are thick and globular; see also Budding. A study of buds in botany is of great interest, because of the numerous types and the important parts which they play. See a modern book on Botany.

Bugle. See Ajuga.

Bugloss. See Anchusa and Echium (Viper's Bugloss).

Bugwort. See Cimicifuga.

Bulb. A bulb is a thick underground bud with fleshy scales, the roots

of which die annually. The Onion and the Tulip may be instanced as typical bulbs. Some plants form bulbils on the stems or at the base of the flowers. The most important bulbous plants are dealt with under their own names. See also Bulbs below.

Bulbinella. See Chrysobactron.

Bulbocodium (bulbō-cō-dium. Ord. Liliaceæ). There is only one important plant in this small genus, and it is the pretty little purple-flowered, Crocus-like B. vernum, which flowers in winter or early spring. It likes a sandy, loamy soil, and a sunny spot on the rockery or at the front of the border. Propagation is by offsets. There is a variety of it called versicolor.

BULBS

Always popular on account of their usefulness both for garden and greenhouse culture, bulbs have grown in favour since their adaptability for culture in bowls has been proved. They are valuable for every class of flower-lover. Those who may not feel any special predilection for the glowing Tulip or the brilliant Hyacinth may succumb to the charm of the Daffodil or the refinement of the Iris. Cheap, easily grown, flowering in most cases in spring, when gay blossoms are doubly welcome after the long, dreary months of winter, bulbs are at the command of everyone. The majority of bulb-lovers only know of such popular kinds as Hyacinths, Tulips, Daffodils, Crocuses, and Irises, but there are many other beautiful bulbous flowers besides these, and they are treated under their own names in this work. First, however, a few words about the principal kinds and the best methods of culture.

Bulbs for the Garden. Bulbs are extremely useful for garden decoration, because they can be planted when the summer flowers are over. Thus, when the ground is cleared of the various summer bedders (see Beds and Bedding-out) another set of plants is ready to go in. It is true that when the bulbs are planted and covered, the ground is left bare for several weeks, but soil is not an eyesore if it is cultivated. Moreover, those who strongly object to bare ground may plant the bulbs in widely separated groups and plant clumps of Wallflowers among them; or they may plant dwarf things like Arabis, Aubrietia, and Forget-me-not at the same time that the bulbs are put in. The beds should be well dug when the summer plants are cleared away, and the soil crumbled with the fork. Before finishing, the soil should be thrown well up from the grass verges, and these neatly trimmed with the shears. Separate groups of bulbs look better than concentric lines. The number per clump may vary from 3 to 12. The bulbs composing each clump may stand 9 ins. from each other, and there should be a clear space of a foot between the various groups. It is a good plan to sprinkle some sand in the holes. A light dressing of decayed manure, supplemented with basic slag at the rate of half a pound per square yard, will suffice for enriching the soil. Crocuses may be covered with an inch of soil; Tulips and the small-bulbed Narcissi with 2 ins.; Hyacinths and large Daffodils with 3 ins. It should be remembered in grouping that the large Narcissi are somewhat taller than the Hyacinths and early Tulips, but that most of the May-blooming Tulips are not only later

in flowering than any of the preceding, but are also taller. The order of blooming is: (1) Crocuses; (2) Hyacinths; (3) Dutch Tulips; (4) May Tulips. There is not much difference between (2) and (3). The drawback to planting bulbs in borders (see Herbaceous Borders) is that the plants are out of sight for the greater part of the year, and careless workmen plant other things over them in autumn, or injure them in digging. The remedies are: (1) labels, which must be renewed now and then; (2) careful digging. When bulbs are unearthed in autumn it is found that they are rooting freely, and have commenced top growth, but when replanted at once they sustain no injury.

Bulbs in Grass. It is common to plant bulbs in turf nowadays. Daffodils are particularly suitable, and Crocuses and Snowdrops are also good. Hyacinths and Tulips should be kept for open soil. The bulbs may be planted in autumn, either by taking up pieces of turf here and there, stirring the soil, adding a little sand and basic slag, and replacing the turf; or by using a special bulb-planter, an implement obtainable from large bulb-dealers which obviates lifting the turf. All the Narcissi look nice in grass, and the Poet's must be remembered for late blooming. It is not advisable to plant in tennis lawns, or in grass close to the house, as cutting has to be deferred, for the sake of the bulbs, till the middle or end of June; and by that time the grass has grown long and tangled. Bulbs may be planted freely in the woodland and wild garden.

Bulbs in Pots. Every greenhouse-owner learns the value of bulbs in winter and spring. They give him charming material for his stages. Despite a little stiffness, Hyacinths are pre-eminent; but Tulips and Daffodils are beautiful too. All love a gritty, loamy soil; and a splendid compost is 3 parts loam, 1 part leafmould, and ½ part sand, all well mixed and used in a moist but not sodden state. The best sizes of flower-pot are 5-in. and 6-in., the former for 1 Hyacinth or Polyanthus Narcissus, the latter for 3 Tulips or Daffodils. The potting may be done in October, and the soil should be pressed firmly, though not made quite hard, round the bulbs, the tips of which may be left protruding. By standing the pots on a bed of cinders and covering with a few inches of cocoa-nut fibre refuse, the bulbs can be safely disposed of for 6 or 8 weeks. They will not want watering during that time. The fibre will check top-growth till root action has developed, which is desirable. The tips should not extend more than an inch in the fibre, however. When brought out the plants can be kept quite cool, or subjected to gentle heat, according as late or early bloom is wanted. Strong heat is not desirable. With water, staking, liquid manure twice a week when buds show, and a light, airy place, the plants will be successful. Tulips and Daffodils may be planted out after they have gone out of bloom if desired.

Bulbs in Bowls of Fibre. This modern method of growing bulbs has much to recommend it, being clean and light, and giving results equal to those from pots. Various kinds of bowl are suitable. Peat-moss fibre, mixed with fine shell and a little charcoal, is the material used. One peck suffices for 6 bowls 7 to 8 ins. across. It should be thoroughly moistened through and through while it is being turned about in the mixing process. Tulips and Daffodils, used in threes

in 6-in. wide bowls, look well. Hyacinths and Liliums may be used also. The tips of the bulbs may protrude slightly from the fibre, which should be made firm. Stones may be laid in to prevent the plants falling over when developed. As soon as the bowls are filled they should be stood in a dark, cool place. A dry cupboard near a fire is not good; a cellar is better. The fibre must never be allowed to remain quite dry for long. In 6 or 8 weeks the bowls may be brought into the light. Stakes will be needed for the Hyacinths and the larger Daffodils.

Bulbs in Water. Water culture is not practised much now that fibre has proved so good, but Hyacinths may be grown in glasses if desired. The cottage widow loves to have a few glasses on her window-ledge, and her better-placed sisters also find great interest and pleasure in this system of culture. All bulb-dealers and most crockery-makers supply suitable glasses, which only need filling with clean water containing 2 or 3 pieces of charcoal to be ready for the bulbs. Even, firm-based bulbs should be chosen, and set in just above the water. A few weeks in the dark will set the roots moving freely, and then the plants can have light. Wire supports will be needed when the plants bloom.

Bulbs in Boxes for Transplanting. When dealing with bulbs in autumn it is a good plan to fill one or two shallow boxes with Tulips and Daffodils, as it often happens that places can be found for bowls of bulbs in spring which are not vacant in autumn. The plants can be shifted successfully from the boxes when they are in bud, and if moss is packed round and over them they look fresh, neat, natural, and pretty when they come into bloom.

Bulbs in Bowls of Water. Bulbs may also be grown in bowls partially filled with bright, clean pebbles, and then filled up with water. Polyanthus Narcissi look very nice done in this way. The " Joss Lily," so popular a few years ago, belongs to this class.

Bulbs in Window-boxes. All the popular kinds come in very useful for window-boxes when the summer occupants are cleared away.

The various bulbs worth growing will be found named in their proper alphabetical places throughout the book.

Bullace. This fruit (Prunus insititia) is not of much importance from the garden point of view, and need not be grown where space is limited. A good Plum (see Plum), or even Damson (see Damson), uses space to better advantage.

Buphthalmum (bŭph-thăl-mum. Ord. Compositæ). These are tall, hardy herbaceous perennials, suitable for the border, and thriving in ordinary well-drained soil in a sunny position. Propagation is by division in spring. The best are salicifolium grandiflorum, speciosissimum (Telekia speciosissima), and speciosum (cordifolium), all of which grow about 2 ft. high and have yellow flowers in summer.

Burgundy Mixture. This is a substitute for Bordeaux Mixture, and is used for spraying Potatoes in order to keep off blight. Soda is used instead of lime, and the proportions are: 6 lb. sulphate of copper, $7\frac{1}{2}$ lb. washing soda, 50 gallons of water. Bordeaux Mixture is to be preferred.

Burning Bush. See Dictamnus Fraxinella.

Butcher's Broom or Box Holly (Ruscus aculeatus. Ord. Liliaceæ). A good plant for a shady place, growing about a foot high. It is useful for planting under trees.

Butomus umbellatus (Flowering Rush). See Flower Garden: The Water Garden.

Butterbur. See Petasites.

Butterfly Flower. See Schizanthus.

Butterwort. See Pinguicula.

Buxus. See Box.

C

Cabbage (Brassica oleracea capitata. Ord. Cruciferæ). One of the most useful of all the green vegetables, and particularly valuable in spring, when good hearts take the place of Brussels Sprouts and Savoys, and supplement Broccoli.

Sowing for Spring. Seed should be sown early in August, but it is a good plan to make two sowings, one a fortnight earlier than the other. The seed may be sown thinly in a reserve bed of fine soil, and covered about ½ in. If birds are troublesome, protect the seed bed with fish netting. Thin the plants if they become crowded during September.

Planting. Towards the end of that month, or by the middle of October, plant 18 ins. apart, more or less according to the variety. A piece of ground may be chosen from which a summer vegetable has been cleared, and an Onion bed is good, because the ground is both fertile and firm.

Winter Treatment. Directly the ground is dry enough to be trodden on in late winter, run the hoe between the plants, and sprinkle nitrate of soda or sulphate of ammonia among them at the rate of 1 oz. per square yard, taking care to keep it off the leaves. If the soil is loose it should be rammed firm. Should any plants throw up flower stems (" bolt ") they should be pulled up and thrown away at once.

Varieties. Bolting will not cause much trouble if suitable varieties are sown. The following are reliable:

Harbinger (small)	Emperor (medium)
Early Offenham (medium)	Flower of Spring (large)
Ellam's Early (medium)	

Late Crops. Cabbages may be had in summer and autumn by sowing in March, April, and May, and transplanting when about 4 ins. high. The following are good varieties for this purpose:

Defiance	Imperial
Improved Nonpareil	Christmas Drumhead (for autumn and winter)
Winningstadt	

See also seedsmen's specialities in both cases.

Cutting. When cutting Cabbages the stem should not be removed with the heart, because if left small secondary Cabbages will form on it.

Enemies. The principal are club-root, gall-weevil, and caterpillar. For remedies, see under Broccoli.

Pickling Cabbages. Cabbages for pickling should be sown out of doors in August and transplanted in autumn; they will then make close, firm hearts in July of the following year.

Chou de Burghley. A hybrid Cabbage of good flavour which may be sown in spring and transplanted 2 ft. apart.

Couve Tronchuda. The Braganza Cabbage is grown for the thick midribs of the large leaves, which make a good substitute for Seakale. Sow in spring and transplant 2 ft. apart.

Coleworts. Sow in late spring. The Hardy Green may be planted 2½ ft. apart. The Rosette is good, and may be planted 15 ins. by 12.

Cacalia, Tassel Flower (Ca-cā-lia. Ord. Compositæ). Only one species is grown, the graceful flame-coloured annual coccinea (Emilia flammea), which may be sown outside in spring in ordinary soil. It is useful for cutting.

CACTI: CULTIVATION AND SELECTION

The term Cactus is applied collectively to a number of genera which have a common character, such as Cereus, Echinocactus, Echinopsis, Epiphyllum, and Rhipsalis. All of these plants are Cacti. The majority of them were originally grouped in one genus, called Cactus, in allusion to the spininess of the first member so named. They are fleshy plants, mostly of slow growth, thriving in a cool, airy house. One or two, notably Epiphyllums, are good room plants. The Cactuses require a plain, gritty soil, such as loam with a good sprinkling of shattered brick and sand. They may be given water in summer when the soil becomes dry, but should be kept with hardly any in winter. As natives of arid districts, Cacti are used to a dry atmosphere, but they may have a moist one when growing in summer.

Propagation. They are propagated by seeds, grafting, cuttings, and division. When seeds are available they may be sown in very gritty, porous compost in well-drained pots, preferably in a greenhouse in spring. Kinds that form stems may be propagated by cuttings of these growths, which should be laid in the sun for a few days to get rid of some of the sap, otherwise they may damp off; they should then be inserted in gritty soil. Species of tufted habit may be divided when the plants are repotted in spring. Epiphyllums are generally grafted on to stocks of Pereskia or Cereus.

The following are some of the principal Cacti:

Cereus flagelliformis, pink flowers in spring.
,, grandiflorus, white, summer, a night bloomer.
,, Macdonaldiae, white and red, summer.
,, nycticalus, white, summer, a night bloomer.
,, speciosissimus, scarlet, summer.
Echinocactus gibbosus, white, autumn.
,, ,, nobilis, white, autumn.
,, Leeanus, yellow, spring.
Echinopsis cristata, cream, summer.
,, ,, purpurea, purple, summer.
,, Eyriesii, white, summer, sweet.
,, ,, flore pleno, double.
,, Pentlandii, white and red, summer.
Epiphyllum Russellianum, rose, spring.
,, truncatum, rose, spring and summer.
Mamillaria crassispina, red, summer.
,, dolichocentra, rose, white spines, summer.

Mamillaria echinata, yellow, summer.
,, elongata, yellow, summer.
,, longimamma, yellow, summer.
,, Zuccariniana, crimson, early summer.
Melocactus communis, rose (Melon Cactus).
Opuntia decumana, orange, summer.
,, leucotricha (ursina), white, early summer (Grizzly Bear Cactus).
,, Rafinesqui, red and yellow, summer.
Pereskia aculeata, white, autumn (American Gooseberry).
Phyllocactus Ackermanii, crimson, summer. (Many hybrids and varieties.)
Pilocereus senilis, white spines and long white hairs (Old Man Cactus).
Rhipsalis Cassytha, green and white, late summer.
,, sarmentacea, white, a good basket plant.

Special mention may be made of Epiphyllum truncatum, as a popular Cactus for rooms. It produces its brilliant flowers on the edges of the branches. There are several varieties, differing in colour from the original species. It is generally grafted on to Cereus speciosissimus or Pereskia aculeata, but those who have no stocks may insert cuttings. The plants may be started in a warm greenhouse about mid-winter, put into a cool house in summer, and given very little water in winter.

Caiophora (kī-oph-ora. Ord. Loasaceæ). The species lateritia, offered by seedsmen, is the same as Loasa (or Blumenbachia) lateritia, and is a rambling biennial which may be flowered the same year if seed is sown in a warm greenhouse in late winter. The orange flowers are attractive, but the leaves have stinging hairs and the plant needs careful handling.

Caladium (că-lā-dium. Ord. Aroideæ). Except for the species argyrites, these are large-leaved, expansive plants, and need large pots and a roomy house to be done justice to. They are grown entirely for their foliage, which is of great size, borne shield-like on the stems so as to show to advantage, and beautifully coloured. They thrive best in a warm greenhouse in which a humid atmosphere can be maintained. When huddled with other plants in a small, dry house, they soon lose their glow. Most species form tubers, to which they die back in autumn, and from which they start afresh in winter or spring, according to the heat available. Loam, 3 parts, and leaf-mould, 1 part, with ¼th sand, suit them. Propagation is by division and by using root-suckers.

Calampelis. Scabra is the same as Eccremocarpus scaber, which see.

Calandrinia, Rock Purslane (căl-an-drĭn-ia. Ord. Portulaceæ). The species grandiflora, 18 ins., rose flowers, is a good hardy annual for a sunny place, and may be sown outside in spring. Umbellata, 6 ins., magenta, is worth a sunny spot on the rockery, where it will be perennial, though flowering the first year from seed. Any friable garden soil suits.

Calanthe (căl-ăn-the. Ord. Orchidaceæ). The Calanthe is one of the most important of all Orchids to amateurs, because in addition to great beauty it has the advantage of easy culture. It is what is called a " terrestrial " Orchid, that is, it is grown in soil, not on

blocks. Most of the species are evergreen, but vestita is deciduous. One of the most valuable traits is the long duration of the flowers, and fortunately this quality is retained when the spikes are cut and put in water. The deciduous kinds rest in winter, when no more water should be given than is required to keep the pseudo-bulbs fresh.

Potting. The plants may be started into fresh growth in a warm house towards the end of winter, when they should be repotted. The pots should be filled up to one-third their depth with crocks, and the remainder with loam, leafmould (or peat), and Sphagnum moss in equal parts, the whole lightened with sand and broken charcoal. The material should be filled in nearly to the brim, and the plants set on the top. This plan allows a free run to the strong roots. The plants must have a light place, and be kept moist in a temperature of 65° to 75°. When the pseudo-bulbs are fullgrown they should go in a cooler, drier house, otherwise the foliage may be disfigured with black spots due to a bacterium.

Propagation. By division of the pseudo-bulbs when repotting.

Principal Species. Masuca, violet, winter bloomer; Veitchii (Limatodes rosea), rose, winter; veratrifolia, white, spring; and vestita, pink and white, winter. There are several good varieties of vestita and Veitchii.

Calceolaria (cal-ceo-lā-ria. Ord. Scrophularineæ). There are two distinct types of Calceolaria, the herbaceous and the shrubby. The former dies back to the roots at the end of the growing season, the latter holds its stems and leaves.

Sowing Herbaceous Calceolarias. These are generally grown as annuals, fresh batches being raised from seed every year. The principal seedsmen have raised beautiful strains, which under good culture form large plants covered with richly-coloured pouches. The seed is somewhat expensive, and being small should be handled with care (see Begonia). It may be sown in spring. When the seedlings are fairly started they grow rapidly, and may be repotted till they have 6-in. or 7-in. pots, in which they bloom. They will be safe in an airy frame or cool greenhouse in summer, and may be given a warm greenhouse in autumn if early bloom is required, otherwise they will do in a cool greenhouse.

The Shrubby Calceolaria. The best known is the dwarf yellow so often used in flower gardening. It is a brilliant plant, nearly hardy, but subject to disease, which carries off large numbers in summer. It should be planted a foot apart in April, and sprayed (see Bordeaux Mixture). Cuttings of the young shoots may be taken in October, and put in sandy soil in a cold frame, over which a mat may be thrown in cold weather in winter. Golden Glory is a fine variety.

Winter-blooming Hybrids. Several hybrid, yellow-flowered Calceolarias of more vigorous growth than the bedders have been raised, and they are useful for flowering in greenhouses and conservatories in autumn, winter and spring. Clibrani is a particularly good one, blooming profusely and being very bright. Burbidgei is also good. They are of rambling habit, and make large, showy plants.

Calcium. An element found in the older parts of plants. It counteracts poisonous substances such as oxalic acid, forming crystals in

combination. Plants obtain calcium through the medium of chalk (limestone), which is calcium carbonate; and lime, which is calcium oxide. See Manures and Lime.

Calendula (cal-en-dula. Ord. Compositæ). The species officinalis is the common Marigold. The African and French Marigolds are species of Tagetes. See Marigold and Annuals (half-hardy). Several free-flowering double or semi-double varieties of brilliant colour, mostly orange, yellow or lemon, are now offered by seedsmen under the name Calendula. They may be sown in boxes in late winter, pricked out in other boxes and planted out 2 ft. apart in spring in beds or border-groups. They bud at an early stage and flower as they grow, remaining in bloom until autumn. Large numbers of self-sown seedlings spring up the following year. Ordinary soil.

Calico Bush. See Kalmia.

Californian Poppy. See Platystemon.

Calla (cal-la. Ord. Aroideæ). Much the most important plant in this genus is the Arum Lily, often called Calla aethiopica, but now called by botanists Richardia africana. See Arum Lily and Richardia.

Callicarpa (cal-i-cār-pa. Ord. Verbenaceæ). Warm-house shrubs grown principally for their beautiful berries. The best-known species is purpurea, 4 ft., with rosy-purple flowers, purple-stained leaves and stems, and violet berries in autumn. The rarer Giraldiana, with purplish flowers and violet berries, rather taller than purpurea, may also be mentioned. Loam and peat, with sand, form a suitable compost. Propagation is by cuttings in sandy soil with bottom heat. Winter temperature 50° to 55° minimum.

Calliopsis (căl-li-ŏp-sis). Although the true name of this genus is Coreopsis, Calliopsis stands firmly in seedsmen's catalogues for such popular and easily-grown hardy annuals as coronata, Drummondi, and tinctoria (bicolor), all yellow and orange and about 2 ft. high when in full bloom. They thrive when sown outside in ordinary soil in spring and thinned to 1 ft. or so apart. For the perennial species see Coreopsis.

Callirhoe (cal-ir-hō-ē. Ord. Malvaceæ). The best-known species is involucrata, which most seedsmen offer. It is a pretty blue-flowered perennial, suitable for rambling along the ground or on a mound, or could be grown on a trellis. If sown in heat in late winter, the seedlings hardened in a frame and planted out in May, it should flower the same year. Verticillata may be grown in the same way.

Callistemon, Bottle Brush (cal-li-stē-mon. Ord. Myrtaceæ). Singular and attractive evergreens, suitable for a cool house, but must be kept safe from frost in winter. The close spikes, with their long stamens, have gained the popular name of Bottle Brush. The plant enjoys a compost of peat and loam in equal parts, with sand. It may be propagated by cuttings inserted in sandy peat in late spring. The principal species are lanceolatus (semperflorens, also called Metrosideros citrina and M. semperflorens) and speciosus (also called Metrosideros speciosa), both of which have crimson flowers.

Callistephus (calli-stē-phus. Ord. Compositæ). The China Aster, C. hortensis (chinensis), is offered by some seedsmen under the name of Aster sinensis, and is well worth growing, as it produces large

single blue flowers freely in summer. It should be grown as a half-hardy annual. See Aster and Annuals (half-hardy).

Calluna, Ling, Heather (căl-ū-na. Ord. Ericaceæ). The common Ling or Heather is Calluna vulgaris, a British plant with purplish flowers. It is well known as a wilding, but its varieties, alba, white; Hammondi, white; pygmaea, dwarf; and argentea, silvery leaves, are esteemed for gardens. They like peaty soil, but will grow in most good garden soils. Propagation is by cuttings. For the best Heaths, see Erica.

Callus. A swelling at the base of a severed shoot, which springs from the cambium layer at the junction of bark and wood. Rudiments of buds are formed in it and it is the precursor of rooting. Gardeners speak of cuttings " callusing."

Calochortus, Mariposa Lily (călō-kōr-tus. Ord. Liliaceæ). A lovely genus with flowers as large as Tulips and beautifully marked. They thrive in light, gritty soil in sheltered, sunny places, or may be grown in pots. For the garden they should be planted 9 ins. apart and 3 ins. deep in autumn. Albus, white; luteus, yellow; pulchellus, yellow; splendens, lilac; and venustus, white, are the best species.

Caltha, Marsh Marigold (căl-tha. Ord. Ranunculaceæ). The Marsh Marigold is a useful waterside plant, and several good garden forms are procurable, such as bicolor, white; monstrosa flore pleno, large double; and nana flore pleno, dwarf double. They thrive in moist soil, and are increased by division in spring.

Calycanthus, Allspice (căly-căn-thus. Ord. Calycanthaceæ). These plants are fragrant both in bloom and leaf. The brownish flowers of C. floridus are not conspicuous, but they are deliciously fragrant. They are borne in June. There are several varieties of it, of which asplenifolius and variegatus are two of the best. Occidentalis, which bears red flowers in August, is also very sweet. These plants are nominally hardy in Great Britain, but it is best to give them a sheltered place in a shrubbery or near a wall. They like a peaty soil, but are not fastidious. The plant sometimes grown under the name of Calycanthus praecox is Chimonanthus fragrans, which see.

Calypso (cal-īp-so. Ord. Orchidaceæ). The species borealis is a somewhat rare North American hardy Orchid suitable for the moist base of a rockery or the bog, where it should have partial shade. The purplish rose flowers with white lip, crested with yellow, are very pretty. Height 3 ins. The stems are bulb-like. Peat and loam form a suitable compost. Strong plants may be deprived of the basal offsets if propagation is desired.

Calystegia, Bearbind (căly-stē-gia. Ord. Convolvulaceæ). While some of these relatives of the Convolvulus have beautiful flowers, notably hederacea (pubescens), with rosy flowers in early summer; and sepium dahurica, with rosy purple flowers in summer, the genus as a whole must be regarded with suspicion. When the common Bearbind gets out of control in a small garden it is apt to become a nuisance, twining round many plants which would look much better without it. The better Calystegias, such as those named above, are best planted to cover stumps and stakes in the wild garden. They may be propagated by division in spring, or by seeds.

Calyx. The ring of leaves below the corolla of a flower. The parts (sepals) are generally green but coloured in a few cases.

Camassia (că-măss-ia. Ord. Liliaceæ). Useful for the herbaceous border in May, bearing handsome spikes of blue, starry flowers. Plant 2 ins. deep and 9 ins. apart in autumn.

Cambium. The tissue lying within the bast (see Bast) which being composed of rapidly-dividing cells (meristem) renders grafting and budding possible.

Camellia (că-mĕll-ia. Ord. Ternströmiaceæ). One of the noblest of our evergreen shrubs, the Camellia is so nearly hardy that it may be grown in cool houses in northern climes, and outdoors in warm, moist, southern districts of England. It is a beautiful plant, its habit being bushy and compact, its leaves glossy, its flowers symmetrical, substantial and of brilliant colours. The white varieties are quite wax-like in texture. The double Camellias are the most popular. The one serious difficulty with the Camellia is its habit of casting its flower-buds, which it does on very slight provocation. The trouble is less serious with planted-out than with pot plants, and probably turns on correct watering (see Watering).

Compost. Turfy loam and peat in equal parts, with broken charcoal and sand.

Propagation. By striking young shoots in sandy soil in a shaded frame in July. Grafting, layering, and inarching are practised in the nurseries.

Repotting. To be deferred with established plants until the pots are quite full of roots, and then done directly the buds set. The plant makes its growth after flowering. Large plants in borders may be pruned into shape after flowering.

Good Varieties. Alba plena, white; Comtessa Lavinia Maggi, white, carmine stripes; C. M. Hovey, crimson; Donckelaari, crimson and white; Lady Hume's Blush, flesh; Marchioness of Exeter, rose.

Camomile. See Anthemis.

Campanula, Bellflower (cămpăn-ula. Ord. Campanulaceæ). A large and valuable genus, giving good material alike for greenhouse, border and rockery. The Canterbury Bell is a Campanula (C. Medium), and this, with C. pyramidalis, is best treated as a biennial (see Biennials). Both of these beautiful kinds may be grown in pots. A few of the best border Campanulas other than the Canterbury Bell are as follows:

carpatica, blue, early summer, 9 ins.
,, alba, white, early summer, 9 ins.
,, turbinata, deep purple, 6 ins.
,, venusta, lavender, early summer, 9 ins.
glomerata, blue, early summer, 18 ins.
,, dahurica, blue, early summer, 18 ins.
latifolia, blue, early summer, 2 ft.
,, macrantha, blue, early summer, 2 ft.
longistyla, purple, summer, 2 ft.
persicaefolia, blue, early summer, 2 ft.
,, Moerheimi, semi-double, white, 2 ft.
,, alba plena, double white, 2 ft.
pyramidalis, blue, 6 ft., summer in pots, 2 ft.
Trachelium, blue, summer, 3 ft.

All of these are readily raised from seed sown out of doors in May, and some of them may flower the same year, like annuals. Most of them may be propagated by division in spring. They will thrive in ordinary well-drained soil. Loreyi, purple, 2 ft., is an annual, and may be sown out of doors in April to flower the same year. Pyramidalis and its white variety should be sown in spring for pot work, pricked off, potted singly in 3-in., shifted to 6-in., and wintered in a greenhouse. The species fragilis (Barrelieri), with blue flowers in summer; and isophylla, blue, summer, are nice basket plants. The white variety of the latter is even prettier than the blue. For rockwork, carpatica and its varieties; garganica and its variety hirsuta; Portenschlagiana (muralis) and the Bavarian variety; Allionii; pulla and the hybrid G. F. Wilson; pusilla and its white variety alba, and Raineri, may be chosen. C. rotundifolia is the English Harebell and the Scottish Bluebell.

Campernelle Jonquil. See Jonquil.

Campion. See Agrostemma, Lychnis, and Silene.

Canary Creeper (Tropaeolum aduncum or canariense. Ord. Geraniaceæ). A pretty yellow-flowered creeper, which comes in useful for verandahs, palings, window-boxes, balconies, and other places. Although a perennial, it answers well to treatment as an annual. It is generally raised under glass in March and planted out in May, but if the soil is friable and the position sheltered, it may be sown out of doors at the end of April, and will flower in summer.

Candytuft. The pretty white, carmine, crimson, and other Candytufts which we grow as hardy annuals (see Annuals) are the offspring of Iberis coronaria and I. umbellata. The latter is a very old plant, a native of Spain, and bears purple flowers. The Candytufts are among the best of the hardy annuals, and are deservedly popular, owing to their compact habit, profusion of bloom, and ease of cultivation. A good strain of White Spiral is very beautiful and remains in bloom for several weeks if sown outside in spring and thinned well. For the evergreen and rock Candytufts see Iberis.

Canker. One of the commonest diseases of fruit trees, canker is particularly destructive to Apples. It attacks young as well as old trees of certain varieties, and in particular soils. In mild cases the canker may be cut out and the surfaces brushed with tar. The following mixture of chemical fertilisers has been found good when spread under the trees in February and pointed in: 12 parts superphosphate, 10 parts nitrate of potash, 8 parts sulphate of lime, 4 parts common salt, and 1 part sulphate of iron. Use 4 oz. per square yard. A dressing of yard manure spread over the roots in autumn is also good. See also Apple.

Canna (căn-na. Ord. Scitamineæ). The Canna grows in favour more rapidly as a greenhouse than as an outdoor plant. It is perhaps less used now in the garden because " sub-tropical " gardening has given place to the culture of hardy herbaceous plants. The new dwarf forms have finer flowers than the old race, and make really beautiful plants in 7-in. pots. They develop large spikes of brilliant flowers at about 2 ft. high, and the rich colours are well set off by the abundant and handsome foliage, which in some varieties is brown, and in others green. These varieties may, of course, be planted out in beds if desired. They should be started in pots, and planted out 2 ft. apart

in deep, rich soil towards the end of May. They enjoy weekly soakings of liquid manure.

Compost. Young plants started in spring, and put in 6-in. pots in a compost of loam 3 parts, leafmould 1 part, and sand, will bloom well by midsummer, but with more heat the roots can be started earlier and flowered by the end of May. When the plants die away in autumn the rootstocks can be stored in a dry, frost-proof place, like Dahlias.

Propagation. They may be divided when growth starts if more plants are required. Named varieties may be obtained from florists if desired.

Canterbury Bell. As stated under Biennials (which see) and Campanula, the Canterbury Bell (Campanula Medium) is a biennial. It does best when sown outdoors in May, thinned, and the plants set out 2 ft. apart in autumn to flower the following year. Seedsmen now offer beautiful strains in separate colours. Most people prefer the semi-double Cup-and-Saucer type to the single or double, but all are worth growing. Pick off fading flowers to obtain a succession of bloom.

Cantua (căn-tua. Ord. Polemoniaceæ). The species buxifolia (dependens) is a handsome greenhouse evergreen, growing 4 to 6 ft. high, and bearing rosy flowers in spring. It thrives in a sandy mixture of peat and loam, and may be propagated by cuttings under a bell-glass.

Cape Gooseberry. See Physalis.

Cape Hyacinth. See Hyacinthus candicans.

Cape Jasmine. See Gardenia.

Caper Spurge. See Euphorbia Lathyris.

Capitulum. A cluster of small flowers forming a head as in Daisies, Clover, etc.

Capparis, Caper Tree (căp-par-is. Ord. Capparideæ). This genus is not important from the garden point of view, but it has enonomic value, as the species spinosa yields the commercial " capers." It has white flowers, and may be grown in a greenhouse in peat and loam if desired. Propagation is by cuttings of mature wood, inserted in sandy soil under a bell-glass.

Capsicum and Chili. These are generally grown in gardens for their ornamental fruit. The Cayenne, which has long, narrow, red fruit, and the Mammoth Red Chili, which has large fruit, are the best known. There are varieties with yellow, scarlet, crimson, and coral fruits. The Long Red Capsicum is used in pickles. The best method of culture is to sow in heat in spring, prick off, and subsequently pot singly.

Capsule. A dry dehiscent fruit of 2 or more carpels, as in the seed-pod of the Poppy.

Caragana, Siberian Pea Tree (căr-a-gā-na. Ord. Leguminosæ). The only species grown to any extent is arborescens, a tree growing 15 to 20 ft. high, with clusters of Pea-like flowers in spring. There are several varieties, including a dwarf (nana) and a drooping (pendula). The latter is generally grafted on arborescens, which is itself raised from seed. The rarer species Boisii, from Thibet, is a small bush with feathery leaves and yellow flowers. Both species are perfectly hardy and suitable for the shrubbery, where they do best in sandy loam.

Carbon. An element with remarkable powers of combining with other elements. Charcoal and graphite are pure carbons. Carbonic acid gas, or carbon dioxide, is present in the atmosphere in the proportions of 4 to 10,000. It is absorbed and disintegrated by plants. See Assimilation.

Cardamine, Lady-Smock (car-da-mī-ne. Ord. Cruciferæ). The common Lady-Smock, with its white or lilac flowers ("lady-smocks, all silver white"), is Cardamine pratensis. Garden lovers prefer the double white, which grows about 18 ins. high and blooms in May. C. diphylla (Dentaria diphylla of the older botanists) is also pretty. It bears white flowers in May, and grows about 18 ins. high. All like moist soil in a cool spot, and may be propagated by division.

Cardinal Flower. See Lobelia cardinalis.

Cardoon (Cynara Cardunculus). The Spanish Cardoon is much esteemed by Continental cooks, who use the midribs of the leaf and the stem in soups and stews. Except in damp soil, the plants should be grown in trenches like Celery. They may be raised from seed sown in heat in March or out of doors in a warm border in April. They should be planted 18 ins. apart and given abundance of water. In August the stems may be drawn together, tied, earthed so as to exclude light and air, and left for two months, when they will be blanched and ready for use.

Carduus, Thistles (cār-dŭ-ŭs. Ord. Compositæ). Seedsmen offer one or two species, such as benedictus and marianus, and they may be grown as hardy annuals if desired; but they are not suitable for small flower gardens, where they may easily become troublesome weeds owing to scattering seeds. The place for them is the large wild garden.

Carex, Sedge (cā-rex. Ord. Cyperaceæ). One or two of the Carexes are good for growing in pools among Water Lilies, and the species Pseudo-cyperus may be mentioned particularly in this connection. It has triangular stems, and grows about 3 ft. high.

CARNATIONS, PICOTEES, AND PINKS

Whether represented by the long-stemmed American Carnations; the fragrant Malmaisons; the flaked flowers beloved of old-time florists; the Cloves of the border; or the Pinks of the cottage garden, this lovely genus wins our admiration and love. Carnations, Picotees, and laced Pinks have sprung from Dianthus caryophyllus, and the common white Pink from Dianthus plumarius. Carnations have been specialised for hundreds of years, and it would be difficult to trace their upward progress from the small, irregular early forms to the large, symmetrical varieties which we have to-day. Florists have worked patiently on them for century after century, with the result that we have at our command an almost embarrassingly rich assortment of lovely varieties.

Garden Carnations. The best garden Carnations are drawn from the self or one-coloured class, the modern representatives of which combine perfect form with brilliant colours and (in many cases) delicious scent. Would that we could add freedom from insects and fungi, but the truth is that modern Carnations, whether from over-fertilisation, excessive propagation, or unnecessary coddling under

glass, are not constitutionally vigorous. It is best to start with a collection of young, clean plants in spring, and plant them in deeply-tilled but not heavily manured soil. Friable, well-drained, sandy loam is the best; should the soil be stiff and heavy it will be wise to crumble it well by digging after frost, and adding road scrapings, mortar rubbish, and ashes, both of wood and coal. If the soil is rich the plants had better be set 18 ins. apart. Neat flower stakes must be put to the plants as the flower stems rise, and care must be taken not to bind stem and stake tightly. The plants may be grown in beds or in border clumps. Where there are several beds to fill one might well be devoted to Carnations and Picotees, for the plants will be more varied, and more interesting the summer through, than zonal Geraniums and Begonias, if less brilliant at a particular season. It must be remembered that the plants are evergreen, and as long as they are healthy they are attractive.

Diseases. Unfortunately, the beauty of the silvery foliage is often marred by fungi, which cause dark blotches, rusty patches, dark spots on leaf and stem, and shrivelling. Rust (Uromyces caryophyllinus) and Spot (Macrosporium dianthi) are both serious pests, which should be countered with prompt measures. The remedy is to spray the plants with water in which fresh liver of sulphur (sulphide of potassium) has been dissolved at the rate of 1 oz. per 3 gallons for indoor and 1 oz. per 2½ gallons for outdoor plants, acting at the first sign of attack. Pot plants should be taken outside to be sprayed. Ill-health may arise from underground enemies, such as wireworm, leather-jacket grubs, and surface caterpillars, which see, but an attack from this source is generally shown in puny growth rather than rusty leaves. As a first step, traps of Potato and Mangold slices may be set among the plants to draw off the grubs. Unwonted pallor in summer may be due to a maggot which works within the stems; its burrow should be found and well probed with a long needle.

Propagation. If the plants are healthy and the soil good they will produce strong, non-flowering side-shoots, which can be turned into separate plants by making a slit along the stem a few inches from the root-stock in August, and pegging them into a small heap of sandy soil. In 6 or 7 weeks, when they have rooted freely, the young plants may be severed from the old ones and planted out. It is, however, well to put a reserve into small pots and winter them in a cool frame, giving them plenty of air in fine weather. They may prove useful in filling gaps in spring.

Summer Show Carnations. A good garden self Carnation is often a good show variety, too, but so high is the standard of exhibition quality which has been reached, that it is almost impossible to attain to it without growing the plants in pots, and giving them the shelter of glass. A light, airy pit or greenhouse is desirable; and a brisk, lively atmosphere must be maintained. With a close, warm air the plants would fall a prey to disease. Loam, with a quarter of decayed manure and a liberal dash of sand, makes a good compost. Two plants may be grown in a 7-in. or 8-in. pot, and each restricted to one flower stem, the buds on which may be thinned to three.

Winter and Spring Carnations. There are three sections of winter and spring Carnations: the Tree, the American, and the Malmaison.

The Tree or Perpetual is less popular than it was, the larger flowers, longer stems, and richer fragrance of the Americans having brought this class (which is really a glorified Tree) into greater favour. The culture is practically the same, as both kinds are raised from cuttings in spring in a warm house or frame, potted as required, grown under cool, airy conditions through the summer, and flowered in gently heated houses the following winter. They may be grown singly in 5-in. or 6-in. pots, in a similar compost to that recommended for show varieties. They should be staked as needed, watered regularly in summer and as required in winter, and given weak liquid manure twice a week when coming into bloom. The Malmaisons are given substantially the same treatment, but they are not so accommodating as the others, and are easily upset by a mistake in watering or ventilating. On this account they are not much grown in mixed collections of plants, but are left to large establishments where a separate house can be devoted to them, and where they can be put in charge of a skilled man.

Carnations from Seed. In days when there is much trouble from disease it is not every Carnation-lover who will bind himself to named varieties, propagated vegetatively by layers or cuttings; many prefer to trust to seedlings, which, if they do not produce flowers of the highest quality, judged by the exhibition standard, are nevertheless beautiful and sweet. It is a good thing to sow a packet of seed from a reliable florist in spring, using sandy, friable soil, and aiding germination with gentle bottom heat. In due course the seedlings are pricked off, hardened in an unheated frame, and then planted out 9 ins. apart in a spare bed. In September they are treated like newly-rooted layers; i.e. planted out or potted for the winter. A sowing of hardy border mixtures may be made out of doors in June, with the Wallflowers and other biennials.

Margaret and Grenadin Carnations. The Margaret and the old scarlet Grenadin and its white variety, are charming in the garden and for cutting. They will flower the same year if sown in heat in spring, the following year if sown later without heat. They are perfectly hardy, and bear a profusion of perfumed flowers.

Picotees are really Carnations with coloured edges and need the same treatment.

Pinks differ in some respects. See Pink.

Carob Tree. See Ceratonia.

Carpels. The divisions of the ovary in a flower. In some cases they are united; in others free.

Carpenteria (carpen-tēr-ia. Ord. Saxifrageæ). The species californica is a beautiful evergreen shrub, which produces large, white, fragrant flowers in June. It may be grown out of doors if it can be given the shelter of a wall, otherwise it must be kept under glass. It is well worth planting out in a large conservatory. It is not particular as to soil, and may be propagated by cuttings.

Carpinus, Hornbeam (cār-pī-nus. Ord. Cupuliferæ). The Hornbeam, C. Betulus, of which there are several varieties, is used as a hedge plant, particularly by nurserymen, who find its fast growth, and habit of holding its leaves through the winter, useful for getting divisional

shelters quickly. It thrives in most soils, but prefers clay to chalk, and is easily increased by seeds, suckers, or layers.

Carpocapsa pomonella (cārpo-căp-sa), the Codlin Moth. See Apple.

Carrot, Daucus carota (dāu-cus. Ord. Umbelliferæ). Carrots thrive best in sandy, friable soil, and should not be put on heavy, wet land when there is any other alternative. In an extremity it is a good plan to grow them on ridges a foot high. The ground should not be manured heavily, and if it can be arranged for the crop to follow Beans, Peas, or Celery, for which the ground was well done, no manure will be needed. It is a good plan to draw drills 15 ins. apart and to sprinkle in crushed oyster shell and wood ashes in mixture. The seed may then be sown thinly and covered with an inch of soil. Exhibition growers, however, make separate holes 2 ft. deep with a spike or crowbar, fill with sandy compost, sow 3 or 4 seeds in each, and thin the resulting plants to one. From mid-March to mid-April is a good time to sow, choosing a period when the soil is dry enough to crumble readily. One ounce should suffice for 175 ft. run of row. Thin early and continuously, pressing the soil firmly round the plants left at each thinning to exclude the Carrot fly, whose grubs are very destructive. Should the plants turn rusty and flabby, white grubs may be found in the roots. Another preventive is to moisten some sand with paraffin oil and sprinkle it among the plants while young, especially after thinning. Lift in October and store in sand, or in a mixture of coal dust and sand, in a dark place. Good standard varieties:

Short	*Long*
Early Gem	James's Intermediate
Guerande	St. Valery

See also seedsmen's specialities.

Caryopteris (cāry-ŏp-ter-is. Ord. Verbenaceæ). Sub-shrubs, not perfectly hardy and therefore the better for a sheltered place and friable loamy soil. The best-known species is Mastacanthus, a bush growing 2 to 3 ft. high, with toothed downy leaves and violet flowers in autumn. Propagation is by seeds or cuttings in spring, in a warm house or frame. Mongolica, with blue, Fuchsia-like flowers; and the rarer tangutica, with violet flowers, both small shrubs, may also be mentioned.

Cassandra (căss-ăn-dra. Ord. Ericaceæ). Allied to Andromeda. The shrubs often called Andromeda angustifolia and A. calyculata are now classed as Cassandras, the former being considered a variety of the latter. They are North American shrubs, growing about 2 ft. high, and producing white flowers in spring. They like a peaty soil.

Cassia (căss-ia. Ord. Leguminosæ). The best-known species is corymbosa, which produces yellow flowers in early summer. It is an evergreen shrub about 3 ft. high, and requires a warm greenhouse or conservatory. Loam, with a third of leafmould and some sand, suits. Propagation is by seeds or cuttings in spring. There are many other species, and some yield the senna of commerce.

Cassinia, Golden Heath (cass-in-ia. Ord. Compositæ). The best plant in this genus is fulvida (Diplopappus chrysophyllus), the Golden Heath, which is a handsome shrub with erect branches and Heath-

like leaves, the upturned edges and tips of which are yellow. It is not related to the Heaths, but shares with them a love of peat. Propagation is by cuttings inserted in sandy peat under a hand-light in summer. Plant in spring, choosing a sheltered place.

Castanea, Sweet Chestnut (căs-tā-nea. Ord. Cupuliferæ). The Sweet or Spanish Chestnut is Castanea sativa, and its nuts are much esteemed. They will keep a long time if stored in dry sand, and are very tasty when roasted. The species is a handsome tree, and there are several varieties, differing in the form and colour-marking of the leaves. It is not, however, planted so extensively for ornamental purposes in parks and pleasure grounds as the Horse Chestnut, for which see Aesculus. It is extensively grown in Kent to yield posts and poles for hop and fruit-gardens, the wood being hard and strong while young.

Castor-oil Plant. See Ricinus.

Catalpa (că-tăl-pa. Ord. Bignoniaceæ). Handsome trees, of which the North American species bignonioides is the most important. It is a tree growing 20 to 30 ft. high, and bearing white, purple-spotted flowers in July. There are several varieties, including one with yellow and another with silver-variegated leaves. It is a good lawn tree, as it does not grow to a great size, or run immoderately at the root, yet the head has a nice spread and the flowers are pretty. It is not particular as to soil, and will grow near towns. Propagation is by seeds in spring or layers in autumn. Cordifolia (speciosa) and Kaempferi are two other good hardy species; while the rarer modern kinds, Duclouxii and Fargesii, both with pink flowers, should be mentioned.

Catananche, Cupidone (cătan-ăn-che. Ord. Compositæ). The species caerulea, blue; and its blue and white variety bicolor, are hardy herbaceous perennials, growing 2 to 3 ft. high, and flowering in summer. The flowers are dried for winter use. The plant is not particular as to soil, and may be propagated by seed or division.

Catasetum (cătă-sē-tum. Ord. Orchidaceæ). A large but not very important genus of hothouse Orchids, generally grown on blocks or in baskets, but also available for pot culture in crocks and a fourth of peat and some Sphagnum moss. They should be given a good deal of water while growing, but when growth is completed they should receive very little. Propagation is by division when fresh growth starts. They want abundance of heat and moisture in summer. The most popular species is Bungerothii, which has white flowers; there are several varieties of it. Macrocarpum and splendens, with their varieties, are also esteemed.

Catchfly. See Silene.

Caterpillars. Caterpillars, hatching from the eggs of certain butterflies and moths, are very destructive to many kinds of plants. Several kinds attack fruit trees (see Apple), while others infest green vegetables (see Broccoli). Hand-picking and syringing with brine may be resorted to in certain cases. Birds eat large quantities of some caterpillars, and should be encouraged in gardens.

Cathcartia (căth-cār-tia. Ord. Papaveraceæ). The only species is villosa, which has yellow Meconopsis-like flowers, borne on long stems in June. The stems and leaves are covered with brownish hairs. Height 1 ft. It may be grown on a shady part of the rockery.

Propagation is by seed, sown in a warm greenhouse or frame in spring.

Catkin. A crowded spike of stemless flowers as in the Oak and Hazel (male only), Poplar and Willow (male and female).

Cat Mint. See Nepeta.

Cattleya (cătt-leya. Ord. Orchidaceæ). One of the most important genera of Orchids, giving noble flowers of beautiful and varied colours. They may be grown either in pots (alternatively pans) or baskets. In the former case the pots should be nearly filled with fibrous peat, Sphagnum moss, and crocks, and the plants set on the top. The pots may be 3 parts filled with crocks to begin with, then the plant should be set on a layer of moss, and the roots packed in with peat and Sphagnum in the proportions of 2 and 1 respectively. Repotting may be done every other year, and the best time is when roots begin to push from the young growths. They like a winter temperature of 55° to 65°, and a spring heat of 60° to 70°. An airy house is required, with light shade in summer. They must have abundance of water while growing, but only enough to prevent the pseudo-bulbs from shrivelling in the resting period. They may be increased by division when fresh growths start. There is considerable variation in height and habit among Cattleyas. Of recent years many hybrids have been raised, both specific and generic. Cattleyas have been crossed with Laelias, and also with Brassavolas. The following are the principal species; for the hybrids, of which there are large numbers, specialists should consult a standard book on Orchids:

Aclandiae, 6 ins., late spring.
citrina, 6 ins., spring.
intermedia, 15 ins., spring.
labiata vera, 12 ins., autumn.
Lawrenceana, 9 ins., spring.
Loddigesii, 15 ins., late summer.
Mendeli, 15 ins., late spring.
Mossiae, 15 ins., late spring.
Schilleriana, 6 ins., spring.
Skinneri, 10 ins., spring.
Trianae, 15 ins., winter.
Warscewiczii (gigas), 15 ins., early summer.

Cauliflower (Brassica oleracea botrytis cauliflora. Ord. Cruciferæ). Among the most delicious and esteemed of all green vegetables, Cauliflowers are in season from June to November inclusive, but crops can be obtained in early summer by sowing the previous autumn, or in heat in winter. Autumn crops may be secured by sowing thinly in a reserve bed out of doors in April, covering with half an inch of soil, screening with tanned fish netting to keep off birds, and transplanting after rain during June or July. It is important that young Cauliflowers should not be crowded in the seed-bed, and if they get too thick in spite of thinning it is wise to set them out 9 ins. apart in a reserve bed until their permanent quarters are ready. Small varieties should be planted 2 ft. apart ultimately, and large ones 2½ or 3 ft. asunder. The ground should be dug deeply and manured liberally. Decayed farmyard manure is good, and light dressings of nitrogenous fertilisers (see Cabbage) may be given when

the plants are in full growth. With respect to autumn sowing, it is best done in a frame at the end of September, although in the absence of glass a sowing out of doors early in that month may be tried. Frame-raised plants should be put out in April. Summer Cauliflowers may be started with advantage in frames, because they grow much faster than when sown out of doors in February or March. Only shallow boxes are required. Care must be taken not to water excessively and to give abundance of air. The plants may be put out any time after they are 4 ins. high. They transplant well up to 6 or 8 ins. if the weather is showery. All classes of Cauliflowers do badly in poor, dry, shallow soil. They like moist, fertile ground. The following standard varieties are good:

Early	*Late*
Early Erfurt	Eclipse
Early London	Autumn Giant

See also seedsmen's specialities. For enemies, see under Broccoli. If seed is wanted cut away part of the heart and let the remainder go up to bloom.

Ceanothus (se-an-ō-thus. Ord. Rhamneæ). Beautiful shrubs, the most useful of which are the hardy evergreen kinds, such as dentatus, blue; thyrsiflorus, blue; and Veitchianus, blue; inasmuch as they can be utilised for house walls. Floribundus and rigidus are also evergreens. Azureus and its fine variety, Gloire de Versailles, both blue, are deciduous. There are many fine hybrids, among which Indigo and Henri Desfosse may be specially mentioned. All flower in late spring or early summer. They like a sunny aspect, but Veitchianus will thrive on a north aspect, where it will grow rapidly in ordinary soil if not heavy and wet. They may be planted in autumn or late winter. Propagation is by layers, or by cuttings of side shoots in sandy soil under a bell-glass in August. Few wall plants are capable of making a more charming picture on a dwelling than a healthy Ceanothus.

Cedar, Cedrus (cē-dar, cē-drus. Ord. Coniferæ). The Cedar of Lebanon is Cedrus Libani, an impressive tree. The Mount Atlas Cedar is C. atlantica; and the Deodar or Indian Cedar is C. Deodara. All are handsome, and not the least so is atlantica, which has a pyramidal habit. There are several horticultural varieties of each of the species named; atlantica glauca is particularly desirable and popular: it makes a beautiful lawn tree in a large garden. A deep, well-drained sandy soil is best. Stiff, cold clay is unsuitable. Plant in autumn.

Cedar, Red. See Juniperus Virginiana.

Cedar, Silver. See Juniperus Virginiana glauca.

Cedar, White. See Thuya gigantea.

Cedronella (cē-dron-ĕll-a. Ord. Labiatæ). The species cana is the only one much grown. It is a sub-evergreen semi-shrubby plant, with hoary leaves and crimson flowers in July, height about 3 ft. It likes a sandy loam, with peat, in a sheltered place. Propagation is by cuttings in early summer, preferably under a handlight or bell-glass. Plant in spring. Triphylla, cedar-scented, is the Balm of Gilead.

Cedrus. See Cedar.

Celandine. The Greater Celandine or Swallowwort is Chelidonium

majus; the Lesser Celandine is Ranunculus Ficaria. The former, or its double form, is sometimes grown in a moist, shady part of the wild garden. It may be increased by division in spring.

Celeriac. See Celery.

Celery (Apium graveolens. Ord. Umbelliferæ). Delicious as a relish, excellent when cooked, and with the property of relieving rheumatic sufferers, Celery is a valuable crop. It benefits the whole garden indirectly, as the deep cultivation and thorough tillage entailed in its culture are good for succeeding crops. The trench system is convenient, as it allows of abundant watering and liquid manuring, and provides plenty of earth for blanching, but it is not indispensable. Nice crops of Celery may be had by planting between Potatoes.

Early Crops. For early crops the seed should be sown in heat in February, for later rows in a cool house in March. The plant grows very slowly in its early stages, and does not therefore demand much room. When, however, the seedlings begin to crowd it is a good plan to make a reserve bed with a little manure covered with 3 or 4 ins. of soil, and fix a glass sash over it until the weather becomes mild.

Making Trenches. If ground is very limited the trenches for late Celery need not be made till an early crop, such as Peas, is finished. They may be cut 8 ins. deep, 1 ft. or 18 ins. wide, according as one or two rows are to be grown, dressed with decayed manure, and surfaced with a little of the fine top soil. Planting is best done a foot apart after rain in May, June, or July. Shade in hot sunshine until the plants are growing. Soakings of water, varied with liquid manure, will do good.

Enemies. Should maggots make grey lines in the leaves, pinch the affected parts and spray with paraffin oil and soft soap in solution, soft soap being boiled at the rate of 2 oz. per gallon of water and paraffin oil stirred in vigorously at the rate of a wineglassful per gallon while the water is still very hot. The time for application is July, August, and September, fortnightly. But the crop is subject to fungoid attack also, and the oil emulsion will not prevent it. Dustings of sulphur, or of sulphur and freshly slaked lime in equal parts, may be tried, but the application is only effectual in the first stage of the disease. Brown patches with tiny black spots distinguish this fungus.

Earthing. When the plants are a foot high draw the stems together, tie them, and earth up partially, finishing in October. In hard weather spread some litter over the tops.

Celeriac. The Turnip-rooted Celery is a good vegetable and useful for soups and stews. It may be raised from seed in spring and planted a foot apart on level ground in early summer.

Cells. Plant-tissue is composed of cells containing a watery sap which holds sugar, earth-salts, etc. in solution. It may be coloured, as in Beetroot, Copper Beech, and other plants. The nucleus of the cell contains the hereditary characters of the plant and governs its life.

Cellulose. The flavourless insoluble substance which forms the walls of plant-cells.

Celmisia (cel-mĭs-ia. Ord. Compositæ). The species coriacea, white, with yellow centre, 6 ins. high, is not infrequently grown as a hardy herbaceous plant. It will thrive in ordinary soil. Holosericea,

white, yellow centre, is charming. They are evergreen, not perfectly hardy, and best covered with glass in winter. Propagation is by seeds or division in spring.

Celosia (cē-lō-sia. Ord. Amarantaceæ). The two most popular members of this genus are cristata, the Cockscomb; and the feathered sub-variety, plumosa. They are greenhouse annuals, generally grown in pots, but plumosa, red, and its yellow form, aurea, are sometimes used in flower-beds in summer. These two are really sub-varieties of cristata pyramidalis, the pyramidal Cockscomb.

Culture of Celosias. They should be sown under glass in late winter, pricked off, potted singly, and planted out in June. If kept in pots they may be transferred to 5-in., or for large plants to 6-in. and then to 8-in. They should be kept warm and moist, and have weekly doses of liquid manure, till the flowers show, when they may go into a conservatory or "flowering house."

Culture of Cockscombs. The Cockscomb is grown in practically the same way. If the plants come leggy they may be decapitated with a few inches of stem and struck in sandy soil after the head has formed, provided they are kept close in a warm place under a hand-light. With dwarf plants the combs curl inwards until the tips nearly reach the side of the pot, and that is considered good cultivation. They like a compost of loam with a little leafmould or decayed manure, and sand.

Celsia (cēl-sia. Ord. Scrophularineæ). A small genus allied to Verbascum (Mullein). The best-known species is Arcturus, a half-hardy shrub growing about 4 ft. high, and bearing yellow flowers in August. It may be propagated by cuttings of the young wood in a greenhouse. Cretica is a half-hardy biennial, with yellow flowers in July, 4–6 ft. high, and may be raised from seed in a greenhouse in spring.

Centaurea (cĕn-tāu-rea. Ord. Compositæ). Inasmuch as this genus gives us the Cornflower and the Sweet Sultan, it is one of much interest. C. Cyanus is the Cornflower, and there are several colours in addition to the popular blue. This is a hardy annual, and may be grown as such (see Annuals). Moschata is the purple Sweet Sultan, of which seedsmen offer white and yellow varieties; the latter is called odorata by some botanists, thus making it a distinct species from the purple. Grow as hardy annuals. Depressa is a dwarf blue annual species. The most useful of the perennial species are Cineraria, otherwise Cineraria candidissima, which is grown for its silvery leaves, and is raised from seed in heat in spring; macrocephala, a tall yellow perennial; glastifolia, yellow, 4 ft.; and montana, blue, 2 ft.; the white variety of the latter is a good border plant, hardy and free-flowering, but needs careful tying, as its habit is straggly; there is also a red form, rubra. Ragusina used to be grown a good deal for its silvery leaves, but Cineraria maritima is a better plant. The hardy perennials grow in ordinary soil, and are propagated by division in spring.

Centipedes. These wingless, many-footed, crawling creatures are often abundant in gardens, but do not injure plants.

Centranthus, Valerian (cĕn-trăn-thus. Ord. Valerianeæ). The Valerians are bright and free-blooming plants. Macrosiphon, red; and albus, its white variety, are two good hardy annuals, which grow about

2 ft. high and bloom in summer. Ruber (Valeriana rubra) is the common red Valerian, a hardy perennial often naturalised on chalky cuttings in Great Britain. It increases itself by self-sown seeds, and must be kept under control, or it will spread too much. There is a white variety. Both will establish themselves on walls if a few seeds are dropped into crevices.

Centropogon (cen-trō-pō-gon. Ord. Campanulaceæ). The one member widely grown is Lucyanus, a hybrid growing 2 ft. high and bearing rosy flowers in autumn. It may be grown in a warm greenhouse in equal parts of loam and peat, and propagated by cuttings of the young shoots in bottom heat under a bell-glass, using sandy soil.

Cephalaria (cĕpha-lā-ria. Ord. Dipsaceæ). An unimportant genus, except for the one species alpina (Scabiosa alpina), which grows about 5 ft. high, and produces yellow flowers in summer. It will grow almost anywhere, and may be propagated by seed. Tatarica, yellow, 6 ft., is good for a large border.

Cerastium (cĕr-ăs-tium. Ord. Caryophylleæ). The Mouse-ear Chickweed is useful as a carpeter, and may be grown on the rockery where there is room for it to spread without encroaching on more delicate plants, but must be kept under control or it will spread unduly. It will thrive in almost any soil, and seeds freely, springing up in all directions. The two species Biebersteinii and tomentosum are much alike, and both may be increased by cuttings or division in spring where a good many plants are wanted; or the self-sown seedlings may be transplanted. They have white flowers as well as silvery leaves. They may be sown on walls, and are useful as edgings, but should not be planted on small rockeries, or they may smother choicer things.

Cerasus, Cherry (cer-ăsus. Ord. Rosaceæ). The genus Cerasus is now put under Prunus by botanists, but nurserymen and gardeners grow certain species under the old generic name, notably Avium (dulcis or domestica), the wild Gean; Laurocerasus, the common or Cherry Laurel; lusitanicus, the Portugal Laurel; Padus, the Bird Cherry; Pseudo-cerasus, the Bastard Cherry; and serrulata. There are several good varieties of each. Multiplex, double; pendula, weeping; and laciniata, cut-leaved, are varieties of Avium. Rhexii flore pleno is a good ornamental variety of Cerasus. Argentea is a nice variety of the Bird Cherry. Watereri, a double form, represents Pseudo-cerasus, and may be grown in large pots to be gently forced in winter. The others may be grown in the shrubbery, where they may be planted in autumn, preferably in light, well-drained soil. The special varieties are propagated by budding and grafting.

For fruiting Cherries, see Cherry.

Ceratonia, Bean Tree, Carob Tree, Locust Tree of Scripture (cer-a-tō-nia. Ord. Leguminosæ). The species Siliqua is a small tree with feathery evergreen leaves and reddish flowers in late summer. The pods yield a nutritious pulp which is reputedly the food that sustained St. John in the Wilderness. It is not hardy and can only be grown safely outdoors in a sheltered place. Sandy loam is desirable. Propagation is by cuttings of ripe shoots in sandy soil under a bell-glass in summer.

Ceratostigma (cer-at-ō-stĭg-ma. Ord. Plumbagineæ). The plant sometimes grown under the name C. plumbaginoides is the same as

Plumbago Larpentae, which see; but C. Griffithii is a sub-shrub. It has bronze foliage and panicles of deep blue flowers; it is not perfectly hardy, and should have a sheltered place. C. Willmottianum, sky blue, is a beautiful modern Chinese shrub, well worthy of a place on a sheltered wall.

Cercis, Judas Tree (cēr-cis. Ord. Leguminosæ). Among the several trees on which Judas Iscariot is reputed to have ended his life is Cercis Siliquastrum, a native of Southern Europe, which produces purplish-red flowers in May. The flowers are attractive, and the tree is worth planting in the flower garden, but in cold districts it should be given a sheltered place. Height up to 20 ft. A good sandy loam is desirable.

Cereus (cē-rē-us. Ord. Cactaceæ). The principal kinds are described under Cactus, which see.

Cerinthe, Honeywort (ce-rĭn-thē. Ord. Borragineæ). Both major and minor, the annual species offered by seedsmen, have yellow flowers and grow 1 ft. to 2½ ft. high. Ordinary soil. Sow outside in spring with other hardy annuals.

Cestrum (cēs-trum. Ord. Solanaceæ). Allied to Habrothamnus. The most popular species is aurantiacum, a warm-house shrub which produces orange flowers in early summer, and may grow to 5 ft. high. It looks well against a wall or pillar. Loam, with a little peat and some sand, suits. Propagation is by cuttings in sandy soil in spring. Prune after flowering.

Ceterach (ket-er-ăch. Ord. Filices). The hardy Scale fern, Ceterach officinarum, is now called Asplenium Ceterach by botanists. It is suitable for the rockery.

Chalk. Useful as an application to sour, acid soils. See Manures and Lime.

Chalk Plant. See Gypsophila.

Chamaecyparis. Now merged in Cupressus, which see.

Chamaelirium, Wand Lily (kămae-lĭr-ium. Ord. Liliaceæ). The species Carolinianum is a graceful North American perennial with racemes of white flowers in early summer. The sexes are on different plants, i.e. dioecious. Height 1 ft. It is at home on a shady part of the rockery. Propagation is by division of the rhizomes in spring, or by seeds.

Chamaepeuce (kămae-pēu-çē. Ord. Compositæ). Two plants are grown under this name, although modern botanists put them in the genus Cnicus. They are C. Casabonae and C. diacantha, the former of which is known as the Fishbone or Herring-bone Thistle. They are grown for their foliage, being planted out in sub-tropical gardens. They may be raised from seed in a warm house in spring, and have ordinary garden soil.

Chamaerops (kămae-rops. Ord. Palmeæ). Fan-leaved palms, gracefully cut. C. humilis is a popular plant, and is comparatively hardy, so that it may be grown in a cool house, or even out of doors in mild districts. Loam, with a little leafmould and some sand, will suit. Propagation is by seed in a warm house, or by suckers. It may be grown in a room, and with careful watering and an occasional sponging of the leaves, will remain healthy a long time.

Chamomile (Camomile). See Anthemis.

Charcoal. The result of burning wood with exclusion of air, charcoal

is almost pure carbon, and as such is good for mixing with composts for plants of almost all kinds. When broken into pieces about the size of cob-nuts, it may be put at the bottom of flower-pots, where it will help to keep the soil sweet. A few bits in bulb glasses and bowls are good. Orchid growers make considerable use of it.

Chards. When the principal heads of Globe Artichokes have been used, the plants are cut back, and new growths break. When these are about 2 ft. high they are bound round with straw and earthed to blanch them. In about six weeks the stems will be ready, and are then called Chards.

Charlock, Ketlock (Brassica Sinapistrum. Ord. Cruciferæ). This yellow-flowered weed is common in the fields and sometimes invades the garden. It may be killed by an application while in full bloom of bluestone (sulphate of copper) at the rate of 15 lb. per 40 gallons of water; this quantity will suffice for ¼ acre.

Cheilanthes (kȳ-lăn-thēs. Ord. Filices). A genus of ferns, of which two or three species are popular plants. The best known is fragrans, a half-hardy perfumed species. Microphylla, myriophylla elegans and farinosa, which require a warm house, are also esteemed; the last has powdery leaves. Equal parts of loam and peat, with sand and a little charcoal, make a suitable compost. Propagation is by spores, sown in a warm, moist house.

Cheimatobia brumata (Winter Moth). See Apples.

Cheiranthus, Wallflower (ky-er-ăn-thus. Ord. Cruciferæ). By far the most important member of the genus Cheiranthus is Cheiri, the common Wallflower (see Biennials and Wallflower). Alpinus, which grows about 9 ins. high and has yellow flowers in May; and Marshalli, 1 ft. high, orange flowers in May, are both popular plants, and may be used on the rockery. Allionii, orange, is a beautiful biennial, with its brilliant orange flowers, which come with the Wallflowers, but last much longer. Pamela Purshouse is a hybrid between this and Alpinus and has orange flowers. Mutabilis, bronzy orange, a hybrid, is also good. They like a dry limestone soil, but will grow in almost any medium. Propagation is by seeds sown outside in May or June. Kewensis, a hybrid, opening primrose and fading to mauve, 2 ft., should be grown in the greenhouse. Linifolium is the same as Erysimum linifolium, which see.

Chelidonium. See Celandine.

Chelone (kĕ-lō-nĕ. Ord. Scrophularineæ). Allied to Pentstemon. The best-known species is barbata, now called Pentstemon barbatus, which grows about 3 ft. high and bears scarlet flowers in July; Torreyi, 2–3 ft., scarlet, is a fine form; Lyoni, 4 ft., purple flowers in August; and obliqua, 4 ft., purple, August, are sometimes grown. They may be raised from seed in spring, or propagated by division. Ordinary garden soil.

Chenopodium (ken-ō-pō-dium. Ord. Chenopodiaceæ). Only two members of this genus are grown to any extent, viz. atriplicis (purpurascens), an annual growing about 5 ft. high, with purple flowers in August, used as an ornamental plant; and Bonus-Henricus, Mercury, or Good King Henry, which is grown in Lincolnshire as a substitute for Spinach. A newer plant, amaranticolor, will grow 7 ft. high the same year from a spring sowing in favourable conditions, and the young leaves may be cooked. They are bright red, and when

rubbed the pigment comes off on the fingers. It does not ripen seeds in Great Britain.

Cherokee Rose. See Rosa laevigata.

Cherry (Prunus Cerasus). The Cherry is suitable for culture as a standard or half-standard on the Gean stock, and also as a trained tree for walls on the Mahaleb stock. When the Cherry is grown as a trained tree it is found to do better with the branches fastened horizontally than diagonally or vertically. Bone meal and sulphate of potash, 2 oz. of each per square yard in March, will do good, and may be used annually as top-dressings. Budding (which see) and grafting (which see) are practised. It is not often grown as a bush, pyramid, or cordon. It likes a loamy soil on limestone. On rich, deep, substantial "brick-earth" loams with ragstone beneath it grows to a great size and crops heavily.

Pruning. While early cutting back is necessary for shaping, little subsequent pruning should be done, otherwise the trees may throw out gum and die. If the heads get too thick with branches, thin them while full of leaf in summer to avoid gumming; they do not, however, make a mass of wood, as a rule, if the early pruning has been done judiciously; on the contrary, the heads keep open, and the fruiting spurs are produced abundantly. The Morello Cherry bears on the young shoots, so that only old fruited pieces should be cut out. The new wood should be left, unless, on a wall, tidiness is important, when the front shoots may be removed and the side ones tied in.

Enemies. Cherries are not troubled much with canker, but they may be attacked by caterpillars and silver-leaf (see under Plum and Silver-leaf). In what is called "leaf-scorch" the leaves hang shrivelled through the winter and the trees cannot perfect the fruit. Spraying with Bordeaux Mixture (which see) just before the buds open and again after the petals fall is the best remedy. Trees on walls are sometimes attacked by black fly, which clusters in the tips of the young shoots. It may be destroyed by syringing with a nicotine and soft-soap wash (see Nicotine), or a solution of paraffin and soft soap (see Paraffin), or with almost any of the proprietary insecticides sold by seedsmen. Very hot water, with an ounce of washing soda to the gallon, syringed on forcibly, is efficacious. Some growers pinch out the tips of the shoots in May to avoid the fly.

Varieties for Gardens. Black Eagle, Governor Wood, Napoleon Bigarreau, Morello, the last for cooking.

Varieties for Market. Early Rivers, May Duke, Napoleon Bigarreau, White Heart, Kentish. See also Cerasus and Prunus.

Cherry Laurel, another name for common Laurel. See Laurel.

Cherry Pie. See Heliotrope.

Cherry Plum (Prunus cerasifera). See Plum.

Chervil. The young leaves of Anthriscus cerefolium are used in salads and can be obtained in a few weeks from successional sowings of seed made outside in spring and summer. Ordinary soil.

Cheshunt Compound. A useful remedy for fungus diseases in certain popular plants: e.g. China Asters and Salpiglossis, which are apt to collapse under the attack of a Stem-rot Fungus when they should be in full beauty. The mixture can be prepared by mixing two parts by weight of powdered copper sulphate with eleven parts by

weight of fine, fresh ammonium carbonate. The mixture should be put into a closely-corked glass vessel or stone jar and kept for 24 hours, after which 1 oz. should be dissolved in a little hot water subsequently diluted with two gallons of cold water. The mixture should be used immediately. Metal receptacles should be avoided and wood or pottery used instead.

Chestnut. For Horse Chestnut see Aesculus and for Sweet Chestnut see Castanea.

Chickling Vetch (Lathyrus sativus). Often, but erroneously, called Lord Anson's Pea, which is Lathyrus magellanicus (nervosus). See Lathyrus.

Chickweed (Stellaria media. Ord. Caryophyllaceæ). A common weed, easily kept under by regular hoeing. The Mouse-ear Chickweed is Cerastium, which see.

Chicory (Cichorium Intybus). Grown mainly for salads in this country, the seed being sown outdoors late in spring in rows a foot apart, and the plants thinned to 9 ins. asunder. Roots are formed, which are lifted in autumn, packed in soil in boxes and kept in a dark place. The blanched leaves which push constitute the salad. The Witloof Chicory is extensively forced on the Continent, particularly in Belgium, for yielding Seakale-like stems, which are cooked and form a delicious vegetable.

Chilian Beet. See Beet.

Chimney Bellflower. See Campanula pyramidalis.

Chimonanthus, Japanese Allspice (kȳ-mō-nan-thus. Ord. Calycanthaceæ). There is but one species, the deliciously perfumed fragrans, which bears yellow and red flowers. There is a larger yellow variety called grandiflorus. One flower, laid in a saucer of water, will perfume a fairly large room. The shoots harmonise well with Berberis Aquifolium in a vase. It likes peaty soil, and a sheltered wall angle. Propagation is by layers in autumn, and by seeds sown in a warm house in spring. After flowering, cut out the old shoots and preserve the young, which will ripen well against a wall.

China Aster. See Aster and Callistephus.

Chionanthus, Fringe Tree (kiō-năn-thus. Ord. Oleaceæ). Handsome hardy deciduous shrubs, thriving in moist peaty soil similarly to the hardy Heaths (Erica). Retusa, with white flowers in May, 3 to 5 ft. high; and virginica and its varieties, white flowers in June, height 10 to 20 ft., are the principal kinds. Propagation may be by layering in summer, but nurserymen graft them on to Ash.

Chionodoxa, Glory of the Snow (ky-on-ō-doxa. Ord. Liliaceæ). The species Luciliæ is an exquisite little bulb with blue and white flowers in winter, out with the Snowdrops. It is good for the rockery, and for planting in colonies at the front of the border. Insert an inch deep and 3 ins. apart in autumn. Sardensis is a rich self Gentian blue, and is also well worth growing.

Chives (Allium schoenoprasum. Ord. Liliaceæ). The leaves are used as a substitute for young Onions in salads. Ordinary soil. They may be grown from seed or offsets in spring.

Chlorophyll. The green colouring of leaves. The granules must have light, hence the whiteness of plants grown in the dark. Chlorophyll is able to decompose carbonic acid. Protoplasm is embedded in the chlorophyll granules.

Chlorophytum (chlorō-phȳ-tum. Ord. Liliaceæ). This genus is allied to Anthericum, and elatum variegatum, which is used in summer bedding for its variegated foliage, is often called Anthericum variegatum. Loamy soil suits, and propagation is by division. It is an evergreen, and should be wintered in the greenhouse.

Choisya (chōi-sya: Ord. Rutaceæ). The only species grown, ternata, is an evergreen shrub, forming a dwarf to medium-sized bush, and bearing white flowers in early summer. The leaves are green and glossy. It likes loamy soil, and may be propagated by cuttings in sandy soil under a bell-glass either in spring or autumn. It nominally lacks perfect hardiness, but we have known it pass severe winters on an exposed wall in heavy clay in Kent. It may be grown in pots in a cool house if desired.

Chorozema or **Chorizema** (kŏr-ō-zē-ma. Ord. Leguminosæ). Attractive greenhouse evergreens, liking peat, with a third of loam and some sand and charcoal. Propagation is by cuttings in sandy soil under a bell-glass in summer. They require a good deal of water then, but not much in winter. When they start growing they may be pruned and repotted. Angustifolium, with red and yellow flowers; cordatum, red, and its variety splendens; and Henchmanni, scarlet, are the principal kinds. Flavum and superbum are the same as cordatum.

Christmas Rose (Helleborus niger). Not a true bulbous plant, but none the less one of the most beautiful of those handled by bulb dealers. The best time to plant it is September, and those who know their business take care to order it with their earliest bulbs, and to plant a foot apart before the summer has gone. It thrives in most soils, and enjoys shade. Madame Fourcade is a fine variety, and so is maximus; both have white flowers. There are, however, many others, which may be taken note of at shows and in nurseries.

Christmas Bloom. If the clumps can be covered with handlights there ought to be no doubt of a supply of stainless flowers at Christmas. Christmas Roses may be planted under trees and among hardy Ferns, which prevent the flowers from being splashed by soil particles in wet weather, thus maintaining their purity. See also Helleborus. The Lenten Rose (Helleborus orientalis) may be considered with the Christmas Rose, to which it forms a succession. The foliage is brighter in colour, and the flowers are larger and more varied. There are many varieties.

Chrysalid, Chrysalis. The stage of insect life before the perfect winged butterfly or moth. The study of chrysalids is interesting, as they mimic various things on which they are placed to escape the eyes of birds. Those of recognised garden pests should be destroyed when found.

Chrysalidocarpus lutescens. The same as Areca lutescens, a handsome warm-house palm, suitable for cultivation in small pots, and thriving in a sandy compost of loam and leafmould. See Palms.

CHRYSANTHEMUMS FOR GARDEN AND GREENHOUSE

Thousands of people who visit Chrysanthemum shows are impelled to grow this beautiful flower. It gives us a great range of colours and large, handsome flowers at a period of the year when bloom is getting very scarce. Moreover, it is a good town plant. Some of the most

beautiful collections are grown in densely populated districts in East London, where the atmosphere is never of the purest, and where fogs are not uncommon. Large flowers prevail in the prize competitions, and very remarkable they are, as exhibited by the best growers. Blooms of the Japanese section 10 ins. deep and wide are not rare. Of perfect form, beautifully finished, with broad, evenly folded florets, and bright, fresh colours, they are indeed noble examples of floricultural skill. At the same time, the charming single and small double (generally spoken of as " decorative ") varieties have a wide circle of admirers, and we must remember that these play an important part in small houses, and in providing abundance of flowers for cutting. It is mainly from the ranks of the decorative varieties that we draw Chrysanthemums for outdoor culture, and every year the Autumn Queen extends her sway in outside beds and borders.

History. The history of the Chrysanthemum may be briefly summarised as follows: The species indicum and sinense are natives of China, and the latter was introduced to Great Britain in 1764. From them certain varieties were raised. The first double variety was grown at Kew towards the end of the eighteenth century, and within the next 25 years several others appeared. The first show is said to have been held at Norwich in 1829; the first in London was held at Stoke Newington in 1847. The raising of new varieties became active about 1830; the first Incurved appeared about 1836, and the first Japanese in 1860 or 1861. The Pompon Chrysanthemum was raised from a species introduced in 1846.

Classification. With the introduction of many different types, and the rise in popularity of the flower, a system of classification became desirable, and by slow stages the following system was arrived at: The flowers were classified in 10 groups, namely, Japanese (large flowers with long flat or quilled florets); Incurved (smaller flowers, cup-shaped, with quilled florets that curve in towards the centre); Japanese Incurved (larger than ordinary Incurved, with long, broad florets); Reflexed (small, circular flowers with reflexed florets); Japanese Reflexed (like a small Japanese, florets broad and reflexed); Large Anemone-flowered (flat ring of florets round a raised disc of quilled ones); Japanese Anemone-flowered (outer ring of flat drooping florets round a raised disc of quilled ones); Pompon (small, roundish double flowers not more than 2 ins. across); Pompon-Anemone (small form of the large Anemone-flowered); and Single (round, flat flowers, with only 2 or 3 rows of florets, centre open).

As we may reckon in with the Japanese the great majority of the small-flowered double " decorative " varieties grown for greenhouse and garden decoration (although a few of these are Pompons), it is much the most important class. Next to the Japanese, for show only, comes the Incurved; for general purposes the Single holds second place. The rank and file of Chrysanthemum growers could well afford to ignore all the classes except the Japanese and single.

Growing for Large Show Blooms. This is a distinct and specialised form of culture, which should not be embarked on except by those who can give attention to the plants for the better part of a year, make a study of bud-production, provide special soil and pots, and grow large varieties. The routine is briefly as follows: (1) Strike

cuttings (preferably short, sturdy suckers from the base) in November or December, in 3-in. pots filled with loam well lightened with leaf-mould and sand; keep close till rooted, then in a light, cool, airy house till March, when they may be shifted to 5-in. pots, and stood on a bed of cinders in a cold frame, a mat being put over on frosty nights; strike a few more cuttings from tops in spring. (2) Stop such plants as require it in spring, so as to get 3 shoots for giving crown buds in August. "Stopping" is nipping off the top of the plant. The result is that the plants break into three shoots. Any side-shoots which form on these throughout the summer should be picked out at once. Flower-buds with leaf-shoots round them will form in summer. These are called crown buds. The varieties differ a good deal in respect to the best time for the spring stopping, and so they do as to the best time for taking the crown buds ("taking" is removing the leaf-shoots which cluster round the flower-bud). If the first crown appears sooner than experience teaches is the right time for the "taking," it is removed, together with all but one of the leaf-shoots, and a second crown is waited for. Assuming that this comes at the right time, the leaf-shoots surrounding it are picked off and the flower-bud retained for developing into a specimen bloom. This procedure, varied as to time of first stopping according to the peculiarity of each variety, must be adopted with all prize Chrysanthemums, because without it, it would be impossible to get all the varieties at their best together. The peculiarities of every variety grown must be learned by experience, by observation, and by consultation with experts. Speaking generally, prize flowers require from 12 to 13 weeks to arrive at perfection from the time of bud-formation. (3) Transfer the plants to 8-in. or 9-in. pots about the middle of June; using some such compost as the following, and ramming it in well: 4 parts fibrous loam, 1 part decayed manure, 1 part leafmould, and enough sand to make the whole gritty. A quart of bone meal may be well mixed in each bushel of soil. The pots should be drained by laying some overlapping crocks in the bottom and covering with rough flakes of soil. Stand the pots on a bed of cinders in the open air. (4) Support the shoots as they grow throughout the summer, and water regularly—several times a day if necessary, because if the soil gets so dry as to shrink from the side of the pot, success will be jeopardised. Give liquid manure when the buds show colour. (5) Put the plants under glass by the end of September, give plenty of air, and use the syringe.

Enemies. If there is any trace of mildew, dissolve 1 oz. fresh liver of sulphur (sulphide of potassium) in 3 gallons of water, and syringe the plants with it. This may be done even when they are in bloom. The same remedy may be used for rust. It is desirable to stand the plants outside for treatment, as the liquid not only has a disagreeable smell, but discolours new paint.

Growing for Bushes. Much less trouble is involved when it is only a case of growing plants as bushes to yield a larger number of smaller flowers. To begin with, a later start may be made, as it is not necessary to strike the cuttings till spring. The tortuous question of bud-selection may be dropped entirely. It is true that stopping may be advisable, but is merely to get a shapely plant. Thus, if

the tips are pinched off when the young plants are about 6 ins. high it will encourage them to throw outside shoots. Any plants which tend to straggle may be stopped again. Flower-buds will appear in clusters late in summer, and may be thinned or not at discretion. If thinning is done the buds left form larger flowers than without thinning, but of course there are fewer of them.

Culture in the Garden. The Chrysanthemum is a very beautiful autumn flower for the garden, and every garden lover will take care to have a collection of plants, some for lifting when they come into bud and replanting to fill bare places, some for groups in beds or borders, some, perhaps, in a reserve bed merely to yield flowers for cutting. If plants are shifted from one place to another in late summer, the precaution should be taken of giving the soil round them a good soaking just before the removal. If the shifting is done in showery weather the operation will be favoured. Plants set 3 ft. apart in clumps of 3 or more make beautiful colour groups. A start may be made by buying young plants freshly rooted from cuttings in spring. Plant them in deep, manured soil, and give an occasional soaking of water and liquid manure in dry weather. Give each plant a strong stake when necessary, and tie securely, as the growths are rather brittle and liable to be broken in windy weather. When shoots push up from the roots 3 or 4 ins. long take them off, strike them, and so get a fresh stock of good plants for the coming year. In sandy, friable, well-drained soils the roots may be left in the ground all the winter, and they will throw up fresh shoots in spring like an herbaceous plant. Both single and double varieties may be grown in the garden, and by making a suitable selection of varieties it is possible to have flowers from August to December, but fine canvas, such as tiffany, may be fixed above clumps of late bloomers to prevent frost from spoiling the flowers.

Varieties. It is dangerous to recommend varieties of a plant which, like the Chrysanthemum, is still being developed actively by the florists, as the sorts are quickly out of date. Those who want to specialise the flower for exhibition or other purposes should keep themselves in touch with the principal societies and raisers, visiting shows and studying catalogues.

Species of Hardy Summer Chrysanthemums. The value of the genus is far from being exhausted by the beautiful varieties of the florist's Chrysanthemum. There are several good hardy herbaceous perennial species which flower in the garden in summer, notably the Ox-eye or Shasta Daisy, C. Leucanthemum; the Pyrenean or Moon Daisy, C. maximum; and C. (otherwise Pyrethrum) uliginosum. The first two grow about a yard high and make good bushes. They are extremely useful plants, as they thrive in almost any soil, and bear their large white flowers on long stems in May, June, and July. They can be raised in the first place from seed and subsequently increased by division. There are many good varieties. Ordinary soil. C. uliginosum is a taller, less bushy plant, and blooms later.

Annual Chrysanthemums. The beautiful hardy single and double Chrysanthemums offered by seedsmen should not be forgotten, because they thrive in any good garden soil, flower freely in a few weeks from a spring sowing outside, grow about 2 ft. high, and are very useful for cutting. The parti-coloured carinatum type

(Burridgeanum and tricolor); the double Dunnettii, white and yellow; the coronarium set, single and double, white and yellow; the Star group; the double white inodorum Bridal Robe; and the fine form of Corn Marigold called segetum grandiflorum, are all beautiful.

Another important Chrysanthemum is C. frutescens, the well-known Marguerite: see Marguerite.

The popular Golden Feather (see Golden Feather) is Chrysanthemum Parthenium aureum.

Chrysobactron Hookeri (krĭs-ō-bac-tron. Ord. Liliaceæ). Nurserymen offer under this name the plant which botanists call Bulbinella Hookeri, a hardy tuber related to Anthericum, with yellow flowers on thick stems in early summer, height 1½ to 3 ft. It is not perfectly hardy, but can be grown in friable soil, such as sandy loam and leaf-mould, or sandy peat, in the border or on the rockery. Propagation is by division early in spring.

Chrysocoma, Goldilocks (krĭs-ōc-o-ma. Ord. Compositæ). The best-known species is Linosyris, a hardy herbaceous plant now called Aster Linosyris by botanists. It may be grown in the border. C. Coma-aurea is a greenhouse evergreen, growing about 2 ft. high, and producing yellow flowers in July. Peat and loam in equal parts, with sand, suit. Propagation is by cuttings under a bell-glass in spring.

Chrysogonum (krĭs-ōg-on-um. Ord. Compositæ). Virginianum is a good yellow hardy herbaceous perennial, 1 ft. high, flowering in spring and summer. Loamy soil. Propagated by division in spring or early summer. During recent years it has come into favour as a rock plant.

Cibotium. See Dicksonia.

Cichorium. See Chicory.

Cimicifuga, Bugwort (cĭmĭ-cif-uga. Ord. Ranunculaceæ). Very handsome hardy herbaceous plants, well worth growing in the border. They do best in a heavy, moist soil. In light, dry soil they ought to have a shady place. Propagation is by division in spring. The following are good: cordifolia, 3 ft. high, July, white; foetida (frigida, simplex), 3 ft., white; and racemosa, 4 to 5 ft., August, white.

Cinchona (cin-chō-na. Ord. Rubiaceæ). Of no garden value, but of medicinal interest as yielding quinine, which is prepared from the bark, and is famous as a febrifuge.

Cineraria (ciner-ār-ia. Ord. Compositæ). The Cineraria of the florists, whether represented by the round-flowered, smooth-edged strains that were the joy of an older generation, or the " star-flower " type (stellata) and Cactus-flowered which enjoy so much favour to-day, is a free-blooming, brilliant, and easily-grown plant, well worthy of the high esteem in which it is held. Easily raised from seed, almost hardy, blooming in winter and spring, it is a most valuable greenhouse plant. Such others as are grown are now called Senecios by botanists, but only one is much used in gardens, and that is Cineraria cruenta (Senecio cruentus), a greenhouse perennial growing about 2 ft. high, and with purplish flowers in summer.

Sowing. Good strains of seed are rather dear, but they are worth their cost. They may be sown in May and June similarly to Calceolarias, pricked off into boxes, then put singly in small pots, and finally transplanted to 6-in., 7-in., and 8-in. pots, in which they will flower.

Loam, with a little leafmould and sand, suits. They must have cool, airy conditions in summer, as in a well-ventilated frame, or even the open air. Green fly (see Aphides for remedies) must be kept away.

For Bedding. Cineraria maritima, a dwarf plant with silvery foliage, is often used in bedding. It may be raised from seed in spring. The Cineraria candidissima (see also Centaurea) of seedsmen is a variety, and superior to the species. The Diamond is also good.

Cinnamomum, Cinnamon (cinna-mō-mum. Ord. Laurineæ). Unimportant horticulturally, but important economically, as C. zeylanicum yields cinnamon and C. Camphora gives camphor.

Cinquefoil. See Potentilla.

Cissus (cĭss-us. Ord. Amepelideæ). One species, discolor, is grown. It produces greenish flowers in September, but is chiefly grown for its handsome leaves, which are velvety green, marked with white. It may be grown in peat and loam in equal parts, with sand, under the roof of a hothouse. Propagation is by cuttings of side shoots under a bell-glass in heat. Several species once grown as Cissus are now referred to Vitis by botanists.

Cistus, Rock Rose (cĭs-tus. Ord. Cistineæ). Brilliant shrubs, suitable for the rock garden, flowering in June, and thriving in warm, sunny, sheltered places. They like well-drained sandy soil. Propagation is by seeds sown in spring in a frame or greenhouse, or by cuttings in May and layers in late summer. The following are good: albidus incanus, white; crispus, purple; corbariensis, white; cyprius, white; and salviaefolius, white, all 1½ to 2 ft. high; and florentinus (longifolius), white; ladaniferus, white, and its variety maculatus, spotted; laurifolius, white; and lusitanicus, white or yellow, all of which grow 4 ft. high.

Citrus (cĭt-rus. Ord. Rutaceæ). A genus of little value from the garden point of view, but very important economically, giving, as it does, the Orange (C. Aurantium), the Shaddock (C. decumana), the Citron (C. medica), the Lime (C. medica Limetta), and the Lemon (C. medica Limonum). The Otaheite Orange is sometimes grown as a pot plant. Nice dwarf plants can be grown in 6-in. pots, and low standards in 8-in. See Orange.

Cladodes. Compounds of stem and leaf, as in the branches of the Butcher's Broom (Ruscus).

Clarkia (clark-ia. Ord. Onagrarieæ). The Clarkia, in its modern improved form, is the development of varieties of the pretty old single pink species elegans. These varieties are admirably adapted to pot culture, as well as to the open air, blooming profusely in spring from seed sown in a greenhouse the previous autumn. When thus grown they produce spikes 2 to 3 ft. long, clothed with exquisite semi-double or double flowers, almost as large as Balsams and with a better range of colours. But autumn-raised plants potted on may also be bedded out in spring if desired and in early summer there are few bedding plants to vie with them, especially if pinched once or twice to give good shape. Later on the plants sown outdoors in April will bloom and these will retain their beauty until autumn, provided they are grown thinly throughout—not less than 1 ft. apart. A few patches may, however, be left unthinned and pulled in handfuls for vases.

Varieties. The amateur should make a note of such charming varieties as Chamois Queen, Firefly, Orange King, Purple Prince, Salmon Queen, Scarlet Queen, and White Queen, all of distinct and beautiful shades, and look out for seedsmen's novelties. The species pulchella and its varieties marginata and integripetala are also pretty Clarkias.

Clary (Salvia sclarea). An old English plant, getting its name of Clary (clear-eye) from its supposed value in eye affections. It is sown in spring for use as a pot-herb.

Clay. A hydrated silicate of alumina. Although dense clay soils are apt to be troublesome in spring after a wet, mild winter, they are intrinsically valuable, because they are naturally moisture-holding, and therefore tend to meet the requirements of plants better than sand and chalk during summer droughts. It is often best to dig them roughly, or ridge them, in early winter, after the autumn rains have passed, so that frost may pulverise them. Quicklime at the rate of a stone per square rod, or fine chalk at double that proportion, also helps to pulverise clay. If the soil cannot be dug till spring, it should not be thrown up into large lumps, as is commonly done, because cold winds may harden them, but should be broken up well and promptly limed. After that, with vigorous forking and raking, a good sowing tilth can generally be obtained quickly.

Clematis (clĕm-atis or clem-ăt-is. Ord. Ranunculaceæ). One of our most valuable rambling plants, thriving in most soils, and giving a profusion of beautiful flowers. The lovely white montana, which blooms in early summer, may be propagated by cuttings after flowering. Jackmanii and most of the garden varieties and hybrids are propagated in the nurseries by grafting on the species Vitalba (see Grafting); but they may sometimes be struck from cuttings of mature side-shoots under a bell-glass in summer, or from layers in September. The Clematises are not fastidious about soil; they prefer light to heavy land if it is manured; damp, stiff soil is not suitable. They should not be planted where the roots will be subject to constant drip in wet weather. It is wise to plant the Jackmanii set early, and cut them back to within a foot of the ground at once; they are then sure to break strongly; when planted late, and unpruned, they often fail. The pruning of the different kinds varies, and it may be well to classify them:

Coccinea Group: these are hybrids from coccinea (syn. Pitcheri), a scarlet, urn-shaped species flowering in July; the following are good: Countess of Onslow, deep red; Duchess of Albany, pink; and Sir Trevor Lawrence, crimson; thin as required. *Florida group:* these are suitable for cool greenhouses; Battle of Woking, double grey; and Duchess of Edinburgh, double white, are popular sorts; thin out crowded shoots in late winter and leave the rest. *Jackmanii type:* Jackmanii, violet; J. alba Smith's variety, white; Madame Edouard André, red; and Prince of Wales, puce, are four of the best of this set, and they should be pruned hard annually, the young flowered shoots of one year being cut back to the old wood, making way for strong new shoots, which will bloom well the same year. *Lanuginosa group:* these are large and beautiful flowers, suitable for pillars; Beauty of Worcester, violet; Enchantress, double white; and Venus Victrix, double lavender, are three of the best; they do well with

the same pruning as the Florida group. *Patens group:* beautiful for arches and pillars; Fair Rosamond, blush; Lady Londesborough, silver; Miss Bateman, white; and The Queen, lavender, are good; they should have the same pruning as the Florida set. *Viticella group:* Lady Bovill, silvery blue; Viticella alba, white; and V. rubra grandiflora, red, are three of the best, and may have Jackmanii pruning.

Of the old species, Flammula, hardy, white, sweet; indivisa and its variety lobata, white, greenhouse; integrifolia, stemless leaves and erect habit, 2 ft. high, with drooping blue flowers in summer, Durandii is a form with violet and alba one with white flowers; and Vitalba, hardy, white, the Traveller's Joy or Old Man's Beard, may be mentioned. The last is beautiful in the hedgerows in autumn, but montana is a much better garden plant; the newer variety of it, rubens, is desirable, as is the large white variety Wilsoni. Two interesting modern species are Armandii, large white flowers in April, very sweet; and macropetala, a purple-flowered trailer. Recta (erecta), white, 4 ft., and its hybrid grandiflora, are herbaceous Clematises, and suitable for the border.

Cleome gigantea (clē-ō-me. Ord. Capparidaceæ). A warm-house perennial offered by some seedsmen, growing up to 4 ft. high, with white flowers in early summer. Sow in heat in spring.

Clerodendron (clerō-dēn-dron. Ord. Verbenaceæ). Although this is a fairly large genus, only one or two species are grown to any extent. Much the most popular is Balfouri, a variety of Thomsonae, which produces its brilliant light scarlet flowers at the end of summer. It is a beautiful plant, but not easy to do well. It likes the temperature of a hothouse, and a compost of fibrous loam with a fourth of leafmould and some sand. If stock is required, a few of the young side shoots may be taken off in spring and struck in sandy peat under a bell-glass. Water liberally in summer, but sparingly in winter. Balfouri is of vigorous habit and may be used as a climber. Fallax is dwarfer and also has scarlet flowers. This and splendens are evergreens, whereas Balfouri loses its leaves in winter.

Clethra (clēth-ra. Ord. Fricaceæ). Only two species are grown to any extent: alnifolia, white, 4 ft., hardy, blooming in late summer; and arborea, white, 6–8 ft. high, a shrub, flowering in September, and requiring a greenhouse, there is a dwarf variety called minor, and one with variegated leaves called variegata. Peat, with a third of loam, and sand, suits the Clethras. Arborea is best propagated by cuttings in spring under a bell-glass; alnifolia by cuttings in summer or layers in autumn.

Clianthus, Glory Pea (clī-ăn-thus. Ord. Leguminosæ). The best-known species are Dampieri, the Parrot-beak flower, scarlet with black boss, which does well in a hanging basket in a cool house; and puniceus, crimson, which will thrive outdoors in sheltered places, but is best in a cool greenhouse in cold districts. They are evergreen shrubs, which may be raised from seed in spring, and further propagated by cuttings in sandy soil under a bell-glass. They like peat and loam in equal parts, with sand.

Click-beetle. See Wireworm.

CLIMBERS AND CREEPERS

A great many people use the word "climber" in a somewhat loose way in connection with plants, applying it equally to a Gloire de Dijon Rose, which spreads over a considerable area of wall by mere vigour, and to Veitch's Virginian Creeper, which throws out adhesive suckers and actually climbs as certainly as an Indian climbs with his slings.

Accepting the broad definition, we have a large selection of climbers, and there is no reason why walls, fences, palings, arches, pillars, pergolas, and summer-houses should go bare. For high walls there is nothing better than the Virginian Creeper and selected Ivies (see Hedera); but a vigorous Rose, such as the white Madame Alfred Carrière, will cover a considerable area of wall if planted in good soil. The old Rose, William Allen Richardson, may be thought of for an east wall, an aspect on which it will thrive better than most plants. Ivy also does on east and north walls.

Roses and Ceanothuses (see Ceanothus) may be considered for south and west walls, with Pyrus (Cydonia) japonica for low positions under windows. The latter plant produces large, brilliant flowers. A good Honeysuckle is Lonicera flexuosa, for it is a strong grower, free-flowering and sweet. Clematises (see Clematis) must not be overlooked, for they comprise two particularly valuable plants in montana and Jackmanii, and several others of much importance. There is no more beautiful creeper than the Flame Nasturtium, the Tropaeolum speciosum of botanists; but it will not thrive in dry, hot positions. It must have root and atmospheric moisture to give its true beauty.

Climbers and creepers sometimes fail because they are planted in a position where they catch drip from a roof. This should be avoided, if necessary by planting rather farther from the wall than is usual, and then training in. An annual mulching of manure helps the plants. In most cases pruning takes the form of thinning out the older growth to make room for the younger wood. In a few cases, notably the Wistaria, the young wood is spurred to older branches.

Climbers may also be selected for arches, pillars, pergolas, and summer-houses. The following selections may be useful:

Hardy Perennial Climbers	*Half-Hardy and Tender Perennial Climbers*
Ampelopsis	Allamanda
Aristolochia	Aristolochia
Calystegia	Asparagus
Ceanothus	Bignonia
Clematis	Bougainvillea
Cobaea	Cestrum
Eccremocarpus	Clematis
Hedera (Ivy)	Clerodendron
Jasmine	Ficus
Lonicera (Honeysuckle)	Gloriosa
Periploca	Hoya

Hardy Perennial Climbers	*Half-Hardy and Tender Perennial Climbers*
Polygonum baldschuanicum	Ipomaea
Pyrus	Lapageria
Rose	Maurandya
Tropaeolum	Passiflora
Vitis (Virginian Creepers, etc.)	Smilax
Wistaria	Tacsonia
	Thunbergia
	Vitis

Hardy Annual Climbers	*Tender Annual Climbers*
Convolvulus	Ipomaea
Tropaeolum (including Nasturtium)	Mina

The various plants are dealt with under their own names throughout the book.

Clintonia (clin-tō-nia. Ord. Liliaceæ). The two species most grown under this name are probably pulchella, which botanists now name Downingia pulchella, and umbellata; the former a pretty blue-flowered annual growing about 6 ins. high; the latter a white perennial, 6 ins. high. Pulchella may be raised from seed in spring, sown either outside or in a frame. Umbellata may be increased by division; it likes peaty soil, with shade; as does borealis, a rare North American species, with greenish-yellow flowers in May.

Clivia, Imantophyllum (clī-vea. Ord. Amaryllideæ). A great favourite for greenhouse and room decoration. House gardeners esteem the Clivia highly, not only because it has handsome habit and bright flowers, but because it is not affected by artificial illuminants. The plants thrive in loam with a little leafmould and sand, and bloom best when they become pot-bound, so that they should not be repotted frequently. When they are growing freely large quantities of water should be given, with liquid manure twice a week. Miniata and its varieties may be chosen. Propagation is by offsets.

Cloches, Glass bells (Fr. *cloche*=bell), also miniature portable frames, are useful for protecting cuttings whilst rooting, for forcing single plants, such as Lettuces, for temporarily protecting half-hardy subjects, and so on. With the introduction of collapsible cloches, of several standardised sizes and with open ends, which can be used end to end in rows, the range of usefulness of cloches has been considerably extended. Rows of early peas, for example, may be brought on more rapidly than is possible without such protection, and dwarf French beans may be raised several weeks before they are safe from late frosts, whilst throughout the year the development of Lettuces and other quick-growing subjects may be hastened. With the larger sizes, even a few plants of potatoes may be advanced for show purposes. With the comparatively expensive cloches proper, storage was a problem for the owner of a small garden and breakage was considerable in consequence, but the cheaper collapsible cloches can be dismantled and packed away flat into a very small space.

Cloud Grass. See Agrostis nebulosa.

Clove. See Carnation.

Club-root. A fungus disease (Plasmodiophora Brassicae) of Greens. See Ambury and Broccoli.

Cobaea (cō-bae-a. Ord. Polemoniaceæ). Only one member of this genus is grown to any extent, and that is scandens, a rambler bearing purple flowers in summer. There is a variety with white-margined leaves. It is suitable for the roof of a cool house, or for pillars outside in summer, and the best plan is to treat it as an annual, sowing in heat in spring, hardening in a frame, and planting out in June. Ordinary soil.

Cob Nut. See Nut.

Cochlearia. The species Armoracia is the Horseradish, which see.

Cockchafer (Melolontha vulgaris). In its grub stage the May bug feeds on the roots of trees and in the beetle stage on the leaves. The most harm is done as grubs, more particularly because, working underground, they are not seen. If trees suffer from no apparent cause it is well to fork up the soil and leave the starlings to find the pests.

Cockscomb. See Celosia.

Cockspur Thorn. See Crataegus Crus-galli.

Coco-nut Fibre Refuse. This is the best material for plunging (see Bulbs), and it may be used repeatedly for the purpose. In a moist state it is good for freshening up imported Lilium bulbs before potting them. It is also useful for mulching beds in summer, checking the escape of moisture.

Cocos (cō-cos. Ord. Palmæ). The Coco-nut Palm, C. nucifera, has no particular value horticulturally; but the species Weddeliana is one of the most graceful of small palms for greenhouse and room decoration. See Palms for notes on cultivation.

Codiaeum (cō-dī-um. Ord. Euphorbiaceæ). These plants are dealt with under the popular name Croton, which see.

Codlin Moth. The grub is a serious pest of Apples, which see.

Codlins and Cream. A popular name applied to two such different plants as the Sulphur Phoenix Star Narcissus, and the downy Willow Herb, Epilobium hirsutum.

Codonopsis (cō-don-ŏp-sis. Ord. Campanulaceæ). The species clematidea, with white, blue-tinted, bell-shaped flowers in summer, 2½ ft. high, is worth growing in the border and calls for no special soil. Plants may be obtained and planted in spring. If much additional stock is wanted seeds should be saved, as it is not well suited for division.

Coelogyne (cē-lŏg-ĭ-nē. Ord. Orchidaceæ). A charming genus of Orchids, the most popular members of which are cristata and its varieties. The flowers of the species are white crested with yellow; those of alba, white; those of Lemoniana, white with lemon lip. They are easily grown, as they will thrive in a cool house with Cypripedium insigne, Odontoglossum crispum, and other kinds. They are best grown in baskets with fibrous peat, Sphagnum moss, and crocks. They appreciate abundance of water, both at the root and overhead, while in full growth; the supply should be reduced when growth is mature, but they should never be dried off. If repotting is necessary it should be done when new growth starts towards the end of winter. Dayana, a beautiful species with long drooping spikes of yellow and brown flowers, should have a warmer house, as should pandurata, with green and black flowers.

Coix, Job's Tears (cō-ix. Ord. Gramineæ). A small genus of Grasses, of which the species Lachryma-Jobi is grown in flower gardens, being treated as a tender annual, and raised from seed in heat in spring, hardened in a frame, and planted out. The seeds are ornamental.

Colchicum, Meadow Saffron (cŏl-chĭ-cum. Ord. Liliaceæ). The species autumnale is popular in colonies in shady places in autumn; and speciosum, though less known, is still better, for it will endure rain, whereas autumnale drops in wet weather. Both bear large purple flowers, which appear before the leaves. They are at home in grass. Variegatum (Parkinsoni) is an interesting old species with rosy flowers tessellated with purple. Plant 9 ins. apart in summer, and cover with 4 ins. of soil. Propagation is by offsets taken as soon as the leaves wither in summer. The double and white varieties of autumnale are good.

Coleus (cō-leus. Ord. Labiatæ). These evergreen shrubs are valued for their coloured leaves; the flowers are inconspicuous in most cases. One species, however, thyrsoideus, has sufficiently attractive flowers to be grown for its inflorescence alone; the leaves are green and of little ornament. The flowers are pale blue, and are borne on long stems in winter. This species is useful for growing in a collection of plants in a warm greenhouse or conservatory. The ordinary Coleuses are remarkable for the rich and varied colours of their leaves, in which crimson, green, purple, yellow, and white may be seen. Some have one-coloured leaves, others are flaked, others marbled, others margined. Plants may be grown into a nice size the same season if seed is sown in heat in early spring, and with a little pinching they will become compact, shapely bushes. Special varieties may be increased by cuttings. The weakest seedlings, showing the most colour, are generally the best. 6-in. pots will be large enough to flower them in, unless very large plants are wanted, as they develop the richest colour when pot-bound. Sandy loam is suitable.

Colewort. The old Coleworts were really non-hearting Greens, but the seedsmen's varieties, such as Rosette and Improved Hardy Green, do form hearts, if less dense and solid than those of Cabbages proper. They are very different plants, the Rosette being quite dwarf and suitable for planting out about 15 ins. by 1 ft. apart; the Hardy Green tall and needing double the space. They may be sown in May for autumn and winter use. For enemies see Broccoli.

Collinsia (coll-in-sia. Ord. Scrophularineæ). Bicolor is the most important species. It is one of the most useful of hardy annuals, growing about 1 ft. high, and bearing its rose and white flowers in great abundance a few weeks after being sown in the open in spring. Ordinary soil. Or it may be sown outside in September. Other species are bartsiaefolia, purple; grandiflora, purple and blue; and verna, purple and blue, all 1 ft. high.

Collomia (coll-ō-mia. Ord. Polemoniaceæ). Pretty hardy annuals, of which the most useful are coccinea, red; and grandiflora, red and yellow. Both grow about 2 ft. high, and flower in early summer. They may be sown outside in spring. Ordinary soil.

Coltsfoot. See Tussilago.

Columbine. See Aquilegia.

Colutea, Bladder Senna (cō-lū-tea. Ord. Leguminosæ). The most important species is arborescens, a showy shrub growing 10 ft. high,

and producing yellow flowers in summer, followed by inflated seed pods. It may be raised from seed in spring and increased by cuttings under a handlight in September. No special soil is needed.

Commelina coelestis (com-e-lī-na. Ord. Commelinaceæ). A pretty blue herbaceous perennial, growing 2 ft. high, and flowering in summer if sown in a warm greenhouse in February, the plants hardened in a frame and planted out in June. There is a white variety.

Compass Plant. See Silphium.

Conandron (cō-năn-dron. Ord. Gesneraceæ). The species ramondioides is a pretty semi-hardy herbaceous perennial, with lilac flowers having an orange centre in early summer, height 6 ins. It does best in peaty soil on the rockery. Propagation is by division in spring.

Concrete. A suitable concrete for lining the bottom of a Lily-pool or for other purposes is made by mixing 4 bushels of coal ashes and 1 bushel of freshly-slaked lime, letting stand 4 or 5 days, and then adding 1 gallon of salt. Lay the mixture on a base of clinkers or hard core, and after it has set give a second coat.

Cone Flower. See Rudbeckia.

Conifers (Ord. Coniferæ). Trees and shrubs which bear cones, or woody bracts containing the flowers, such as Cedars, Firs, Larches, and Pines. The different kinds are described under their own names in this work.

Conservatory. This structure is a display house, intended to show at their best, and in a tasteful manner, the plants grown in other structures. It is a somewhat expensive house, as it is more ornate than a greenhouse, and it should be near the dwelling, and may be attached to it, so that it can be entered from the drawing-room or other apartment. In large conservatories beds are made for Acacias, Camellias, Palms, and other large plants, while such plants as Passion Flowers, Tacsonias, Roses, and Lapagerias are planted to cover the roof. If there are fairly wide paths, tubs containing Clivias, Myrtles, Agapanthuses, and other favourite plants may be stood here and there. See also Greenhouse.

Convallaria. The species Majalis is the Lily of the Valley, which see. The species polygonatum is the same as Polygonatum multiflorum, the Solomon's Seal, which see.

Convolvulus (con-vol-vulus. Ord. Convolvulaceæ). These beautiful twiners are related to Calystegias and Ipomaeas. There are many species, and they differ a good deal, some being hardy and some tender annuals, others greenhouse or stove evergreens, and others again deciduous perennials. It is unnecessary to enumerate a quarter of the species, as they are of purely botanical interest. Althaeoides, a hardy perennial with pink flowers in June, is good. Cneorum is an attractive dwarf species with pink flowers in May, and silvery leaves; it should be grown in the greenhouse, or in a sheltered place. Major (Ipomaea purpurea) is the popular " climbing Convolvulus " of the seedsmen and of cottage gardens. Mauritanicus is a lovely little trailing shrub, well suited to basket culture in a greenhouse, or to the garden in summer. Sandy loam suits it. It may be raised from seed in heat in spring. The flowers are rich blue and come in summer. Tricolor (minor) is the dwarf annual Convolvulus of the seedsmen. The annual Convolvuluses only need

to be sown outside in ordinary soil in spring or September. C. arvenis is the small Bindweed; see Bindweed.

Cooperia (coo-pē-ria. Ord. Amaryllideæ). An uncommon genus of evening-blooming, primrose-scented bulbs. The species Drummondii, white tinted with red; and pedunculata, white, are offered by some nurserymen. They are not perfectly hardy, and should be grown in a warm, sheltered place in sandy loam. Propagation is by division or home-saved seed.

Coprosma (cō-prŏs-ma. Ord. Rubiaceæ). Only one species, Baueri, is grown to any extent, and that is more often than not represented by its varieties picturata and variegata, which have handsome leaves. They are greenhouse shrubs, thriving in loam with a third of peat and some sand. Propagation is by cuttings in heat under a bell-glass in spring.

Coptis, Gold Thread (cŏp-tis. Ord. Ranunculaceæ). A small genus, the best-known member of which is trifolia (Helleborus trifoliatus), which grows about 6 ins. high, and produces white flowers in April. It likes a moist, peaty soil and a sheltered place. A herbaceous perennial, it may be propagated by division after flowering.

Coral Tree. See Erythrina.

Corbularia. The species Bulbocodium is the same as Narcissus Bulbocodium. See Daffodil.

Corchorus japonicus. See Kerria japonica.

Cordyline, Club Palm (cordy-lī-nē. Ord. Liliaceæ). These plants, which are related to Dracaenas, are grown for their foliage, which is slender and graceful. Australis and indivisa are the two most popular species; there are variegated forms of both. They are sometimes planted outdoors, for summer effect, but are not hardy. Loam, with a fourth of leafmould, and sand, suits them. They are propagated by suckers. Tall, leggy plants may be decapitated, the tops struck in bottom heat, and the stems laid in moist soil or coco-nut fibre refuse in heat to induce shoots to break for cuttings. See also Dracaena.

Coreopsis (cŏr-e-ŏp-sis. Ord. Compositæ). Useful plants, the annual species of which are generally grown under the name of Calliopsis, which see. Lanceolata is a good hardy perennial, growing about 2 ft. high, and bearing yellow flowers in summer; there is a large form, major. Grandiflora (longipes), 2–3 ft., is also a good perennial with yellow flowers in summer. Both of these useful perennials, and particularly grandiflora, are much favoured for the herbaceous border. They flower profusely and long, are useful for cutting, lasting well in water, and thrive in ordinary soil. Grantii, yellow, 2 ft., is a little-known but useful late bloomer. Propagation is by seeds outside in spring, by cuttings in summer, and by division in spring.

Coriaria (corry-āria. Ord. Coriarieæ). A small genus of shrubs, of which only myrtifolia, a deciduous shrub growing 3 to 6 ft. high, with greenish flowers in August, is much grown. There is modern interest, however, in terminalis from Szechuan and its form xanthocarpa owing to their remarkable fruits. They thrive in ordinary garden soil.

Coris monspeliensis (Ord. Primulaceæ). A pretty rockery plant which grows about 1 ft. high, and produces lilac flowers in June. It likes a dry, sunny spot, with sandy peat. It is easily raised from seed sown under glass in spring.

Cork Tree or Cork Oak. See Quercus Suber.

Corm. An underground body differing from a bulb in lacking scales, e.g. Crocus.

Cornelian Cherry. See Cornus Mas.

Corn Flag. See Gladiolus.

Cornflower. As stated under Centaurea, the Cornflower is C. Cyanus. It is so familiar that little need be said about it. There are several varieties in addition to the well-known blue, and seed is purchasable from every seedsman. Sow outside in September, or in April, in ordinary soil, and thin to 1 ft. apart.

Cornish Moneywort. See Sibthorpia europaea.

Corn Salad (Lamb's Lettuce, Valerianella olitoria). A useful salad which may be had in winter by sowing in September in friable soil on a sheltered south border. Sowings may be made at intervals in spring and summer if earlier supplies are wanted.

Cornus, Dogwood (cōr-nus. Ord. Cornaceæ). Deciduous shrubs, much esteemed for the beauty of their foliage and the brightness of the bark. Alba, a Siberian species, has white flowers in July; Späthi and sibirica variegata are popular varieties of it. Capitata (Benthamia fragifera) has white flowers in August; it is not quite hardy; fruit sometimes ripens on a wall in Great Britain, but it is not edible. Florida has white flowers in spring; it is one of the best, and there are good varieties in rubra and pendula. Kousa (Benthamia japonica) is a fine Japanese species, 3 to 6 ft. high. This, and its Chinese form chinensis, are conspicuous with their white bracts. Mas (syn. mascula), the Cornel or Cornelian Cherry, has yellow flowers in February; there are several varieties of it, aurea elegantissima being one of the best. Sanguinea is the common British Dogwood with black berries; it is often planted for winter effect, the red branches being bright. Controversa, a small tree with flat cymes of white flowers followed by blue-black fruits, is an interesting modern species. There are one or two herbaceous perennials, the best being canadensis, with yellowish flowers in summer, suitable for the rock garden where peat can be given. The shrubby Dogwoods need no special soil, but they do not like a dry spot. Propagation is by seeds, layers, cuttings, and division.

Corolla. The collective petals of a flower.

Coronilla, Crown Vetch (coron-ĭll-a. Ord. Leguminosæ). The most popular member of this genus is glauca, a greenhouse evergreen shrub, bearing yellow flowers in late spring; it grows 2 to 3 ft. high; variegata is a garden form of it. They like loam, with a fourth of peat and some sand. Propagation is by cuttings under a bell-glass. Cappadocica (iberica), cream flowers in summer, 6 ins., and varai, pink, are hardy trailers suitable for the rockery; they like loam, peat, and grit.

Cortaderia. The botanist's name for the Pampas Grass. See Gynerium argenteum.

Corydalis, Fumitory (cor-ȳd-a-lĭs. Ord. Fumariaceæ). A useful genus, as the plants will thrive in dry limestone soils, but C. lutea must be kept in hand, or it will become a weed. C. nobilis is good; it grows 1 ft. high, and bears yellow flowers in May onward. Wilsoni, grey leaves; and cheiranthifolia, cream flowers and fern-like foliage, are pretty. Alleni, cream flushed purple, is tuberous. Any soil that is not wet and stiff suits. Propagation is by division in spring.

Corylus, Nut (cŏry-lus. Ord. Cupuliferæ). See Nut.

Corymb. An inflorescence in which the flower-stems are at different levels and of different lengths, forming a level head as in Candytuft.

Corypha australis. The same as Livistona australis. See Palms.

Cosmidium (cos-mĭd-ium. Ord. Compositæ). This is the genus Thelesperma of botanists and the best-known is filifolium (thread-leaved) with orange purple-blotched flowers in summer, height 2 ft. Cosmidiums may also be treated as hardy annuals, sowing outside in April. Ordinary garden soil.

Cosmos, Cosmea (cŏs-mōs. Ord. Compositæ). A small genus which includes one very useful plant in the annual bipinnatus; the type has rosy purple flowers, but seedsmen sell mixtures which include purple, white, and others; they flower profusely and long, and are very good for cutting. Rose Queen, lilac, early flowering, and White Queen are good varieties. The height is about 3 ft. It is best to sow under glass, prick out in boxes, and plant out 1½ ft. apart in May. C. diversifolius is a hardy tuberous perennial, with lilac flowers in September; there is a dark variety called atrosanguineus.

Cotoneaster (co-tō-ne-ăs-ter. Ord. Rosaceæ). Hardy shrubs, suitable for growing against walls. Most of them grow from 4 to 6 ft. high, and thrive in any well-drained soil. Propagation is by seeds sown when ripe, by cuttings in spring or autumn, and by layers in autumn. The most popular species are microphylla and Simonsii; the former has small, glossy, evergreen foliage, and produces white flowers in spring, followed by scarlet berries; glacialis (congesta) is a variety of it. Simonsii has beautiful orange berries. Buxifolia is a dwarfer species sometimes used for rockwork. Frigida, nearly evergreen, has white flowers and red fruits; there is a yellow-fruited form. Many Cotoneasters have been brought from the Far East in modern times. Frigida Viarii is superior to the species, the berries being finer. Divaricata, Henryana, and salicifolia rugosa are fine evergreens, with beautiful foliage and berries in autumn. Moupinensis, lactea, and serotina are deciduous. Humifusa, prostrata, horizontalis, Dammeri and adpressa are rockery creepers. Francheti, an evergreen of spreading habit, produces beautiful orange-yellow fruits.

Cotyledon, Navelwort (coty-lē-don. Ord. Crassulaceæ). This, with the additions which have been made to it by modern botanists, is a very large genus. The Echeverias have been added to it, and so have the Pachyphytums and Umbilicuses, with some smaller genera. They are succulents, with glaucous foliage. The Cotyledons proper are of erect shrubby habit, whereas the Echeverias are low and flattened. The latter were more used in the old carpet-bedding days than they are now. Of the species generally grown under the name of Cotyledon may be mentioned coccinea, scarlet; gibbiflora, pink and yellow; and orbiculata, red; all of which flower in late summer and are suitable for a cool greenhouse. The variety of gibbiflora called metallica, and other species such as glauca, retusa and its variety glauca, secunda and its variety glauca, and rosea, are commonly grown as Echeverias.

Propagation. The Echeverias may be propagated by laying some of the outer leaves in sand in late summer, and taking off the little plants that form on them. The Cotyledons may be propagated by cuttings in summer; they must not be kept close. For soil use sandy

loam. Although the Echeverias are used for the flower garden in summer, they should be wintered under glass. Cotyledon umbilicus, the British Navelwort, is hardy.

Cotyledons (Botany). The first leaves of plants, single in Monocotyledons (Wheat, Onion, etc.), double in Dicotyledons (Cabbages, Peas, etc.); see a modern work on Botany.

Couch Grass, Twitch (Triticum repens). This, although a relative of Wheat, is a dangerous weed, as its underground stems creep widely. They must be forked out, dried, and burned. The spade should not be used for digging, as the pieces of weed cut up and left in the ground grow again; the fork should be preferred.

Couve Tronchuda. See Cabbage.

Cow-dung. See Manures.

Cowslip, Primula veris or officinalis. See Primula.

Cowslip, American. See Dodecatheon.

Crab, Wild Apple (Pyrus acerba. Ord. Rosaceæ). The ordinary Crab is only of value to fruit growers as a stock (see Apples), but the better species, which are generally described as " Ornamental Crabs " by fruit dealers, are worth growing, alike for their beauty and for making jelly. They are generally grown as standards, and will thrive under the conditions recommended for Apples. The fruit is small, but it is borne in considerable quantities and is brilliantly coloured. The four most popular of the older varieties are Dartmouth, John Downie, Siberian, and Transcendent. Seekers of modern Crabs should inquire for Pyrus Malus Arnoldiana, aldenhamensis, Eleyi, Lemoinei, Exzellenz Thiel, magdeburgensis, and Kaido.

Crambe (crăm-bĕ. Ord. Cruciferæ). Maritima is the garden Seakale, which see. Cordifolia, white, 6 ft., is grown in wild gardens.

Cranberry (Oxycoccus palustris. Ord. Vacciniaceæ). A fruit of little value. The American Cranberry, O. macrocarpa, is finer than the British. They are hardy evergreens, liking moist, peaty soil, and propagated by layers.

Crane Fly (Tipula oleracea). See Daddy-long-legs.

Crane's-bill. See Geranium.

Crassula (crăss-ula. Ord. Crassulaceæ). These succulents are allied to Kalosanthes and Rochea. The most popular species is coccinea, which grows about 18 ins. high and has scarlet flowers in summer. Jasminea, which has white flowers, blooms earlier, and is a smaller plant. None of the other species are grown very much. The Crassulas thrive in loam with a third of leafmould and a liberal admixture of sand and shattered brick. Cuttings of young shoots, dried in the sun for a few hours, then inserted in sandy soil in pots, root readily in summer. Give the plants a sunny position in early summer and abundance of water; reduce the supply of water in late summer, and cut the flowered shoots back; give hardly any water in winter.

Crataegus, Thorn (cra-taĕ-gus. Ord. Rosaceæ). A most useful genus, giving us, as it does, the useful hedge " Quick " (see Hedges), and a number of handsome species suitable for standard trees or wall bushes. The following are a few of the best: coccinea (Mespilus coccinea) is a handsome North American tree with white flowers followed by red fruit; there are several varieties of it. Cordata,

white, red fruit, is a late spring bloomer. Crus-galli is the Cockspur Thorn, so called because the thorns are long and curved; white flowers in spring, followed by dark red berries; splendens is a good variety of it. Oxyacantha is the common British Hawthorn or "May," of which there are many garden varieties; one of these, praecox, is the Glastonbury Thorn, an early bloomer which legend says sprang from the staff of Joseph of Arimathaea; Paul's Double Scarlet, and the Double Crimson and Double White, are also varieties of the common Hawthorn, and make beautiful standard trees for lawn and shrubberies; they bloom in spring. Pyracantha is the popular evergreen wall shrub sometimes called the Fiery Thorn; it has various synonyms, such as Cotoneaster Pyracantha, Mespilus Pyracantha, and Pyracantha coccinea; there are several varieties of the Fiery Thorn, and one of the best is Lalandi (Lelandi); they will thrive in town gardens and on east and north aspects. They hold their brilliant berries a long time in autumn and winter if the birds spare them. The Thorns thrive in almost any soil. Standard trees should be staked securely while planting. Propagation of the species is by seed; the special varieties are generally budded on to Oxyacantha. The Black Thorn is not a Crataegus; it is Prunus spinosa.

Creepers. See Climbers.

Creeping Jenny. See Lysimachia Nummularia.

Crazy Paving. Under this name, flattish stones laid irregularly have come into vogue in flower gardens. Crazy paving makes attractive paths. One ton of the type called "Forest Buff" will cover about 8 square yards.

Cress (Lepidium sativum. Ord. Cruciferæ). The plain and curled forms of Cress are largely used with Mustard (which see) as salads and flavouring; the curled is also used for garnishing. The seed should be sprinkled thickly on the surface of fine, level soil in the open, or in boxes under glass; or on flannel stretched tightly on a wire frame and with one end dripping in water. The American Land Cress is neglected in Great Britain, but it is very useful, as it may be grown from seed in spring, and will yield continuously for a long time in summer. The flavour is brisk and pungent. Watercress is not generally cultivated, and when established in a stream grows without attention. It may be raised from seed.

Crinodendron. See Tricuspidaria.

Crinum (crī-num. Ord. Amaryllideæ). Bulbous plants, with beautiful flowers and handsome leaves. One or two species are nearly hardy, and may be grown outdoors in sheltered places in light, well-drained, friable soil; one of the best of these is Powelli, which grows about 3 ft. high, and has red flowers in July; album, white; and rubrum, red, are forms of it. Moorei is very popular for pot culture in a warm house; it grows about 15 ins. high, and has rosy flowers in late spring; there are white-flowered and variegated-leaved forms of it; Mackenii, Makoyanum, and Colensoi are synonyms. Longifolium is a hardy species, with pink flowers in July, growing about a yard high, and enjoying a moist spot; it has several synonyms, such as capensis, riparium, Amaryllis capensis and A. longifolia. Kirkii has red and white flowers in September; it grows about 18 ins. high, and should be grown in a warm house. Giganteum is a tall, white-

flowered species, blooming in July; Amaryllis gigantea is a synonym; it requires a warm house.

Compost. Loam, with a third of peat and some sand.

Propagation. By offsets in spring or by seeds.

Crocosma (crō-cos-ma. Ord. Irideæ). There is only one species, aurea, a South African bulb, growing 2 ft. high, and bearing orange flowers in July. Bulbs should be planted 4 ins. deep in friable soil in autumn. The bulbs may be lifted the following autumn and wintered like Gladioli. It is worth growing in pots.

Crocus (Ord. Irideæ). One of our most popular cheap early bulbs, good for beds, borders, margins, and grass. The golden yellow is the best, but must be protected from birds by stringing black threads above it or other means, otherwise the effect may be spoiled. King of the Blues and King of the Whites are two fine varieties. Purpurea grandiflora is a good dark. Katherine Parlow is a large white. Set 6 ins. apart when lines are being formed. Many of the species are worth planting on the rockery, notably vernus, Sieberi, iridiflorus, and zonatus.

Cross-fertilisation. See Hybridisation.

Croton (crō-ton. Ord. Euphorbiaceæ). The great beauty of the Crotons lies in their foliage, which is both graceful in form and beautiful in colour. It varies greatly, alike in shape and hue. In some the leaves are broad, and either upright or gently arched; in others they are narrow and twisted. Many colours are represented in them. Crotons are beautiful plants for table decoration, and it is customary to grow a collection for this purpose in most large places. The usual home of the plants is a warm, light house, kept moist by frequent syringing; heat, light, and moisture are, indeed, the principal requirements. With them the plants are healthy and rich in colour; without them, weak and dull.

Compost. 3 parts loam, with 1 each of peat and leafmould, and some sand.

Propagation. By cuttings of firm young shoots in peat and sand under a bell-glass in heat in spring. Leggy plants are often dwarfed by cutting a slit in the stem, putting something in to hold it open, binding wet moss round, and keeping in a high temperature until roots have pushed, when the plants are removed and potted. The species are of no importance horticulturally, and need not be described. The seed of C. Tiglium yields Croton oil, a strong purgative.

Beautiful Varieties. Golden Chain, narrow, twisted; Golden Ring, narrow, twisted; Hawkeri, broad; Invicta, broad, yellow with green margin; Morti, broad, yellow and green bands; Warrenii, narrow, twisted.

Enemies. Crotons are liable to attack by nymphs of the brown scale, and in case of necessity the leaves should be sponged with an approved insecticide, such as a 1 per cent solution of Volck.

Crowfoot (Ranunculus). A troublesome weed which must be kept under; it dies if forked out into sunshine.

Crown Imperial (Fritillaria imperialis). A very handsome plant, allied with the common Fritillary, but of different habit, growing 2 to 3 ft. high, and bearing a cluster of large, drooping flowers. A red and a yellow may be obtained from bulb-dealers, also a duplex variety called Crown-upon-Crown. These are splendid plants for the

border, and should be set 18 ins. apart in clumps. They thrive in almost any good garden soil. Propagation is by division.

Crucianella (crū-cian-ell-a. Ord. Rubiaceæ). The hardy perennial species stylosa, the Phuopsis stylosa of botanists, is sometimes grown on banks and rockeries, where it will thrive in poor sandy or chalky soil. Rose flowers. Height 9 ins. Propagation by division. Seed may be sown in a greenhouse in February, or outdoors in April.

Cryptogam. The non-flowering members of the vegetable kingdom were called cryptogams because their methods of increase were not obvious. The word comes from *kryptos*, hidden, and *gamos*, marriage—literally, concealed union. The flowering plants were called Phanerogams, from *phaneros*, visible, and *gamos*, marriage. They are now called Angiosperms. Ferns are an important horticultural section of cryptogams.

Cryptomeria, Japan Cedar (cryp-to-mē-ria. Ord. Coniferæ). Only one species is grown to any extent, and that is japonica, a handsome tree, of which there are many varieties, differing in habit, such as elegans (syn. Veitchii), Lobbii, nana, and spiralis. The Japan Cedar likes a deep, loamy soil, and a sheltered situation. A dry, exposed spot is unsuitable.

Cuckoo Flower. Cardamine pratensis (Lady-Smock). See Cardamine. Also Lychnis Flos-Cuculi. See Lychnis.

Cuckoo Pint. See Arum.

Cuckoo-spit. Many plants are spoiled by spittle-like masses covering a green insect in summer. Syringing with a decoction of quassia water is a good remedy; or they may be brushed away.

Cucumber (Cucumis sativus. Ord. Cucurbitaceæ). Few relishes are more appreciated than the Cucumber, and those who like it generally contrive to have a long supply of tender fruits by sowing successionally in winter and spring. A healthy plant that is kept growing by the maintenance of a humid atmosphere will bear a prodigious quantity of fruit, but a plant that is allowed to struggle along in a hot, dry atmosphere will soon go out of bearing and lose its colour.

Sowing. One firm seed may be placed in a small pot and stood on a hotbed or in a warm house in January, February, or March, or successionally.

Culture in a House. If to be grown in a house, make up mounds of lumpy loam on slates on the stage so that the plants are near the glass. Allow enough laterals to extend to cover the glass, but not more, breaking out shoots where necessary to prevent crowding. When roots show at the top of the mounds add fresh, warm soil. Give water as needed, and damp down frequently to maintain humidity. Give weak liquid manure twice a week while the plants are in full bearing. Cut the fruits young.

Frame Culture. Make up a hotbed of manure and leaves, trample it well down, and put in mounds of soil, one under each light. Spread the shoots over the bed as they grow to prevent crowding. Syringe and water to maintain a moist atmosphere.

Outdoor Culture. Good crops of Cucumbers may be grown outdoors by planting early in June between Pea rows or in some other vacant spot where the soil is rich. Water and liquid manure should be given in dry weather, otherwise the plants will be attacked by red spider, which is the worst enemy of Cucumbers.

Enemies. Canker sometimes attacks the stems of plants under glass; the most common cause is close, wet soil. Always use coarse, lumpy soil. Rub in sulphur at once if an attack is seen. If the plants collapse from no external cause, eel-worm may be suspected. Remove plants and soil and make a fresh start, using soil which has been sterilised by heating to 210°. Spot disease (Colletrichum) is sometimes troublesome, but rarely attacks the fruit if the temperature is kept at about 86°. If present sterilise the soil as advised.

Cuphea (cū-phea. Ord. Lythrarieæ). Graceful plants, with slender, tubular flowers. Only one species is grown to any extent, and that is ignea (platycentra), which grows about 1 ft. high, and has scarlet and white flowers in June; there is a white variety called alba. Although not hardy, Cupheas are often planted in beds for the summer. They can be raised from seed in winter, pricked off, potted singly, and then shifted to 6-in. pots if wanted for the greenhouse. Loam, with a fourth of decayed manure and sand, suits them. Cuttings may be struck in spring.

Cupidone. See Catananche.

Cupressus, Cypress (cū-press-us. Ord. Coniferæ). One of the most useful of the smaller evergreen trees, giving us a number of species well suited to shrubbery borders, and others suitable for lawn specimens. They like a deep, loamy soil, and shelter from cold winds. Propagation is by seeds in spring, and by cuttings. Most nurserymen stock small plants of the best species and varieties, which are supplied cheaply, and may be planted in autumn or late winter. Much the most important species is Lawsoniana (syn. Chamaecyparis Lawsoniana), a graceful Californian tree. Of its several varieties the following may be recommended: albo-spica, Allumi, argentea, argenteo-variegata, erecta viridis, ericoides, lutea and nana glauca; erecta viridis is particularly good. Another important species, macrocarpa, the Monterey Cypress, is also a Californian tree; Crippsii is a good variety of it. Macrocarpa does not transplant well, and consequently is generally grown in pots by nurserymen, who offer it in different sizes. Staking after planting is important. There is a yellowish-green form of it called lutea. Nootkatensis is good and has several varieties. Obtusa, the Japanese Cypress, and its many varieties, are frequently grown as Retinosporas. Pisifera, also grown under the name of Retinospora squarrosa, is useful; aurea and plumosa are two good varieties.

Cup-and-Saucer. See Canterbury Bells.

Currants (Ribes nigrum, rubrum, and album). The reader must not confuse the garden and the grocer's Currants. The former are true Currants, the latter are Grapes, and belong to a different genus. Black and red—and in a less degree white—Currants are very useful garden fruits, for they are excellent stewed, make delicious jellies, and are not entirely negligible for eating raw. The black Currant is easily grown in any fairly deep, fertile soil; it does not care for poor, dry, shallow ground. The large modern varieties are vigorous growers, and should be planted at least 6 ft. apart; 8 ft. is not too much. They may be planted, with other fruit, from November to March inclusive, either in a quarter to themselves, or among large trees, such as standard and half-standard Apples and Plums; but they should not be put close to the stems

of the latter, or both fruits will suffer by robbing each other of the food in the soil.

Propagation. Currants are not put on to stocks, like Apples, Pears, Cherries, and Plums, but are struck from cuttings of the same year's wood, taken about 1 ft. long, and inserted firmly in September. The following year the young shoots are cut back to about 3 ins. long, and a year later shortened one-half. This makes bushes of them by encouraging them to form side branches. The growths may be left to extend, and any sucker shoots which come up from the roots may also be retained.

Pruning. Thereafter, pruning in the case of black Currants will merely consist in thinning out old wood which has fruited; a black Currant must never be cleared of young wood, because that bears the best fruit.

Enemy of Black Currants. This most useful fruit is unfortunately harassed by a destructive enemy in the form of a mite (Eriophyes ribis), which gets into the heart of the buds, feeds on the substance, causing swelling (Big-bud), and kills the trees. Its presence may be known by the buds becoming swollen and rounded. Cut out and burn any affected shoots directly they are noticed in autumn or winter. Lime-sulphur mixture at winter strength (see the directions on the bottle) may be sprayed on when the leaves are the size of a shilling. What is called "reversion" (nettle-head) often follows Big-bud. Affected bushes should be destroyed. Liberal feeding should be practised, especially on poor soil. Manure, with 2 cwt. sulphate of ammonia per acre, will be beneficial. Boskoop Giant, French Black, Goliath, and Baldwin's are good varieties. The group classification adopted by the East Malling Research Station, Kent, is (1) French Black, (2) Boskoop Giant, (3) Victoria (Goliath), (4) Baldwin'

Red Currants. The red Currant is little, if any, less useful than the black, and as it grows in closer form, and bears on the old wood, it needs less room, while yielding quite as heavily. It is a most useful fruit, and will grow in most soils, unless they are either very poor, shallow, and dry, or very stiff and wet. The bushes are raised from cuttings the same as blacks, except that it is customary to prevent sucker growth from the base by removing the buds on the lower half of the cutting and also for 5 or 6 ins. above the ground, so as to allow of a clean stem. The early pruning should be the same, but the later pruning should differ in shortening the young wood, which should be done annually, preferably in summer. The red Currant is not subject to the mite which works such havoc with the black, and is generally a very healthy plant, but aphis may attack it, and occasionally some of the branches become unhealthy through a grub getting into the shoots. Spray with paraffin emulsion. See Paraffin. For magpie moth see Gooseberry.

Varieties. Laxton's Perfection, Red Dutch, and Fay's Prolific are good red varieties. A succession of any good variety, such as the Dutch, can be secured by growing a few of the bushes on a north aspect and they do well as cordons on walls. Red Currants will hang a long while if covered with garden netting, which serves the double purpose of keeping them back and protecting them from birds. White Versailles is a useful white Currant, and requires the same treatment as the red varieties.

Currant, Flowering. See Ribes.

Cuticle. The thickened outer layer of the epidermis of plants, often waxy and acting as a protection.

Cuttings. Large numbers of cultivated plants may be propagated by cuttings, but the time and method differ so greatly that it is impossible to give general instructions in a paragraph. Details are given under the various plants treated in the book. Sandy soil, as containing much air, is best; and cuttings are best put round the edges of a pot because they get more air than in the middle.

Cyananthus (cyan-ăn-thus. Ord. Campanulaceæ). A small but interesting genus, the flowers being of great beauty. The best-known species is lobatus, which has trailing hairy stems, lobed leaves and large blue flowers in summer. Incanus, blue throat with white hairs, 4 ins., is also pretty. The plants are charming for the rockery. Disliking excessive wet in winter, they should be protected with squares of glass at that season. They like a compost of peat and leafmould. Propagation is by tips of the young shoots inserted in sandy soil in the open in April or May.

Cyclamen, Sowbread (cȳc-la-mēn. Ord. Primulaceæ). The hardy Cyclamens are much smaller than the varieties of persicum which we see grown in pots for greenhouse decoration, but they are just as beautiful in their way; in fact, it would be difficult to find anything in the way of hardy flowers more charming than a colony of coum, europaeum, or neapolitanum established in a shady spot. To get the best result a dozen or more corms should be set 6 ins. apart and 3 ins. deep in a clump. They like peaty soil, or loam thoroughly impregnated with leafmould; lime rubbish is also good for these dainty little plants. They will grow under trees and do well among hardy ferns, as at Kew.

Greenhouse Varieties. Raise from seed in late summer, put singly into small pots when they have made 3 or 4 leaves, and transfer to 5-in. or 6-in. the following summer. During hot summer weather they should be kept in a frame or cool, shady house. The air should be kept humid by syringing frequently. Any flowers which show should be picked out until mid-autumn, when the plants will come gradually into flower and remain in beauty in a warm greenhouse for several weeks. Most growers raise fresh stock every year, and discard the old plants after blooming, thus treating them as biennials; but others keep the old plants after flowering. Cyclamens grow slowly in the seedling stage, because they have to form the corm.

Cycnoches, Swan-neck Orchid (cyc-nō-ches. Ord. Orchidaceæ). A small genus of stove Orchids, requiring plenty of heat and moisture while growing, but little in the resting season. They do well in baskets of Sphagnum moss with abundance of crocks and a little fibrous peat. Propagation is by dividing the pseudo-bulbs.

Cydonia, Quince (cy-dō-nia. Ord. Rosaceæ). C. vulgaris is the Quince. The form known as Angers is much used as a stock for Pears (see Pears). The best ornamental species are japonica and Maulei. The former is a popular plant for low walls, owing to its profusion of brilliant red flowers in spring. There are many varieties, differing mainly in hue. Simoni is good. Maulei is also very handsome with its orange flowers, and superba is a fine variety of it. Modern botanists class the genus with Pyrus, which see.

Cymbidium (cym-bĭd-ium. Ord. Orchidaceæ). Evergreen stove Orchids, with recurved leaves and large flowers. The most popular species is eburneum, which bears white, yellow-crested flowers late in winter. Giganteum and Lowianum are also grown a good deal. Hybrids have been raised between the latter and eburneum. Lowianum does well in a cool house, and the hybrids will thrive in less heat than eburneum. The Cymbidiums should be grown in pots in fibrous peat and loam, and given a good deal of water while growing, but a reduced supply when growth is complete. Propagation is by division when growth starts.

Cyme. An inflorescence, the top flower of which opens first, while fresh flower-stems, each with a terminal flower, open below it, as in Forget-me-not.

Cynara. C. Cardunculus is the Cardoon, which see. C. scolymus is the Globe Artichoke; see Artichoke.

Cynoglossum (cy-no-glŏss-um. Ord. Boragineæ). The species coelestinum (the Paraçaryum coelestinum of botanists) is a biennial growing about 18 ins. high, with blue flowers in summer. It may flower the same year if sown early in spring, otherwise it may be sown later to flower the following year. The Cynoglossums are allied to the Navelworts, and Omphalodes linifolia (Venus's Navelwort), also O. verna, are sometimes grown as Cynoglossums.

Cyperus (cy-pĕrus. Ord. Cyperaceæ). Ornamental Grass-like plants, very useful for table decoration. Loam, with a fourth of peat and some sand, suits. Propagation is by division when repotting in spring. They must have abundance of water. Alternifolius and its variegated forms are the most important; but elegans and laxus are also grown. All will thrive in a greenhouse.

Cypress. See Cupressus.

Cypripedium, Lady's Slipper (cĭp-rĕ-pē-dium. Ord. Orchidaceæ). A large and highly important genus of Orchids, comprising hardy as well as tender species. Hybridisation has been extensively practised with this genus, the result being that the considerable list of species has been added to by some hundreds of cross-breds, many of which are very beautiful; they are, however, expensive to a degree in some cases, and can only be specialised by wealthy people. Most of the Cypripediums are evergreens, but the hardy kinds are deciduous. The indoor kinds should be grown in pots with plenty of crocks, the compost being made up of fibrous peat, loam, and Sphagnum moss. The hardy kinds love a cool, moist bed of sandy peat and leafmould in a sheltered place. Repotting for the tender kinds is best done when they start growing in spring, at which period strong plants may be divided. They like abundance of moisture both at the roots and in the atmosphere. The following are the principal species and varieties:

Warm House

barbatum, several varieties.
bellatulum and variety album; these, unlike the majority, should be rested in autumn.
Boxalli.
callosum and variety Sanderae.
caudatum.
Charlesworthii.

Fairieanum.
hirsutissimum.
Lawrenceanum and variety Hyeanum.
niveum.

The colours are mostly combinations of green, brown, yellow, white, and purple.

Cool House

insigne and varieties Chantinii, Sanderae, Sanderianum, etc.
Schlimii and variety albiflorum.
Spicerianum.
villosum and variety aureum.
Calceolus, yellow.
californicum, yellow, spotted rose.
californicum album, white.
guttatum, rose and white.
macranthum, purple.
pubescens, brown and yellow.
spectabile, rose and white (Moccasin Flower).
spectabile album, white.

For the newest hybrids it is well to consult a modern work on Orchids.

Cyrtomium falcatum. This popular fern is now called Aspidium falcatum. See Aspidium.

Cystopteris, Bladder Fern (cȳs-tŏp-teris. Ord. Filices). A small genus, of which the most important species is fragilis, a hardy British fern, liking a compost of loam, peat, and leafmould, with sand; there are several varieties. Propagation is by division when growth starts in spring.

Cytisus, Broom (cĭt-ĭ-sus. Ord. Leguminosæ). Beautiful shrubs, nearly all hardy, and thriving in light, sandy soil. They are allied to Genista, and the yellow species racemosus is sold in the markets as Genista racemosa. Of the principal species, Ardoinii, with yellow flowers, is good for the rock garden. Kewensis is a fine hybrid of prostrate habit, with creamy flowers, hardy. Praecox, pale yellow, very early, is also hardy, and makes a nice bed; as does albus, with white flowers in spring. Racemosus (fragrans) should be grown in pots for the greenhouse; it may be propagated by cuttings in spring, and with a little pinching soon makes a nice bush; the plants will flower the following spring. Scoparius is the common yellow Broom; a more important plant is its variety Andreanus, which has beautiful brown and yellow flowers; sulphureus is a pale yellow variety of scoparius, and other good forms of it are Butterfly and Daisy Hill. Dallimorei, mauve, is a hybrid (albus and Andreanus). Beani, a yellow trailer, is a hybrid (Ardoinii and biflorus). Purpureus, 2 ft., and its varieties, such as albus, white, 1 ft ; versicolor, rose and white; and incarnatum, purple, and decumbens (Genista prostrata), are good for the rockery. See also Genista and Laburnum. The choicer Brooms are grafted on Laburnums, especially for standards; but cuttings will root in a frame in autumn.

D

Daboecia, St. Dabeoc's Heath (dăb-ō-ē-cia. Ord. Ericaceæ). A small genus of low evergreen shrubs, much the most important species of which is polifolia, also called Menziesia polifolia. It is a lovely little shrub, growing about 2 ft. high, neat in habit, and bearing abundance of purplish flowers. It is a native of Ireland, and thrives in peat or loam. There are several varieties, of which the most desirable is the white, alba. Propagation is by cuttings and layers. We have seen this beautiful shrub thriving in decayed needles under a Cedar in a town garden. The branches should be pegged down and covered with light soil to encourage rooting.

Dactylis (dăc-tŷl-is. Ord. Gramineæ). The species glomerata is the familiar Cocksfoot Grass, much used in pastures. There is a variegated form which is used in flower gardening. It thrives in ordinary soil, and is propagated by division. Not quite hardy.

Daddy-long-legs. The Crane fly, Tipula oleracea, is dangerous to gardeners as the parent of the leather-jacket grub, which is very troublesome in many gardens; it is larger than the wireworm, and darker in colour. Regular cultivation, and trapping with Potato slices impaled on sticks near cherished plants, reduce their numbers. Vaporite or Apterite may be dug-in in spring. Starlings and other birds clear off large numbers of the flies when they come out of the turf at the end of summer.

Daedalacanthus nervosus. See Eranthemum pulchellum.

DAFFODILS AND NARCISSI

The popular name "Daffodil" is used by many people in the sense of embracing every kind and variety of Narcissus, but correctly it only embraces the forms of the old English Lent Lily, Narcissus pseudo-Narcissus, the False or Bastard Narcissus—in other words, the Trumpet Section. The following standard sorts may therefore be taken as typical Daffodils:

Early Trumpet Daffodils

Golden Spur — Henry Irving
Obvallaris (Tenby Daffodil)

Later Trumpet Varieties

Cernuus	Madame Plemp
Duke of Bedford	Maximus
Emperor	Minimus
Empress	Mrs. Walter T. Ware
Glory of Leyden	Van Waveren's Giant
Horsefieldi	Victoria
King Alfred	Weardale Perfection
Madame de Graaff	W. P. Milner (small)

Double Trumpets

Capax Cernuus Plenus Telamonius Plenus

There are, of course, numerous others, and fresh varieties appear every year. We do not attempt to name novelties, because the novelty of one year is displaced the next; connoisseurs find them at the spring flower shows. It may be safely said that beautiful as the new varieties undoubtedly are, they are not superior for general garden purposes to the standard sorts named above. If we admit the general name Daffodil as embracing the forms of other species, and again pick out a few good standard varieties of each, we find the following:

Chalice or Star Narcissi
(Incomparabilis group)

Bernardino
Blackwell
C. J. Backhouse
Cynosure
Frank Miles
Gloria Mundi
Homespun
Lady M. Boscawen
Lucifer
Lulworth
Sir Watkin
Whitewell
Will Scarlett
Double Incomparabilis
Golden Rose (Butter and Eggs)
Sulphur Phoenix (Codlins and Cream)
Orange Phoenix (Eggs and Bacon)
Primrose Phoenix

Poeticus
(Poet's Narciss)

Cassandra
Herrick
Homer
Horace
Ornatus (early)
Pheasant's Eye
Plenus (double Gardenia Narciss)

Leedsii Section

Amazon
Ariadne
Evangeline
Mermaid
Southern Gem
White Lady

Barri Section
(with Burbidgei)

Barri Albatross
Barri conspicuus
Blood Orange
Incognita
Red Beacon
Miss Willmott
Seagull
Vivid

For Rockeries

Bulbocodium (Hoop Petticoat) and forms citrinus and monophyllus
Cyclamineus
Minimus
Minor
Moschatus
Nanus
Queen of Spain
Triandrus and forms albus (Angel's Tears) and calathinus

Poetaz Section

Aspasia
Elvira
Klondyke

Double Daffodils

Cernuus plenus
Double incomparabilis
Orange Phoenix (Eggs and Bacon)
Poeticus plenus
Sulphur Phoenix
Telamonius plenus

Tazetta or Polyanthus Narcissi	*Jonquils*
Double Roman	Double Sweet
Grand Monarque	Odorus Campernelle (or Campanelle), single and double
Soleil d'Or	Odorus rugulosus
Paper White	Single Sweet
White Pearl	

It would be superfluous to enlarge on the value of Daffodils, alike for beds, borders, banks, grass, pots, and bowls. Those who plant in beds in autumn may lift after the foliage has lost its greenness, cover with soil in a cool place, and replant in late summer or early autumn. In borders it will suffice to sprinkle seeds of low annuals (see Annuals) around them; or set seedling annuals from boxes about them. Those who plant extensively in grass would do well to procure a special Bulb Planter for the purpose. Speaking generally, while Daffodils will grow in almost any garden, they prefer a rather heavy moisture-holding soil to a light dry medium. The earlier they are planted in autumn the better. The depth may be 3 to 6 ins. Large-bulb varieties may be planted up to 6 ins. deep.

See also remarks under Bulbs, where hints on growing Daffodils and other bulbs in bowls of fibre are given.

Dahlia (popularly dāy-lia, correctly dāh-lia. Ord. Compositæ). A native of Mexico, the Dahlia is not hardy in northern climes, and may be killed in winter if left out of doors unprotected, although in friable, well-drained soils it may survive, especially if some litter is thrown over the rootstock after the tops have been killed by frost. The species are not cultivated, as they are so much inferior to the garden varieties which have been raised from variabilis, coccinea, Merckii, and Juarezii as to be unworthy of places. The horticultural forms are so numerous, and so varied in type, that it has been found necessary to classify them; thus we have: (1) Show, (2) Fancy, (3) Cactus, (4) Decorative, (5) Pompon or Bouquet, (6) Single, (7) Paeony-flowered, (8) Collarette, (9) Zinnia-flowered, (10) Orchid-flowered, (11) Star-flowered, and (12) Pompon-Cactus. Then there is the small single Coltness Gem class, red and other colours. Classes 1, 2, and 5 have double, symmetrical flowers, the petals folding over each other evenly from bottom to top, where no green must show; 1 and 2 differ only in colour; Shows have two colours at the most, Fancies three; Pompons are one-coloured flowers about a quarter the size of the Show and Fancy. Classes 3 and 4 have quilled florets, spreading from the centre to the circumference; the Cactus have pointed florets, the Decorative blunt ones. Pompon-Cactus are practically a small type of Cactus, not quite so loose and "feathery." Paeony-flowered have large, irregular flowers, thrown up well above the leaves. All require the same culture, unless it be a somewhat modified system of pruning for Single and Pompon, which may be allowed to carry more branches than the larger types.

The Show, Fancy, and Cactus are the most esteemed for exhibition, the Single and Cactus are the most pleasing as flowers, the Pompon and Paeony-flowered are the best for the garden. The last have huge flowers with broad, almost flat florets, and as the blooms are thrown

up above the leaves on long, thick stems they are fine plants for making bold colour groups. The Pompon-Cactus are charming for cutting.

Collarette Dahlias are a small class. They are single flowers, with a ring of short florets round the centre. Star Dahlias are singles with widely diverging florets. These, with the Zinnias, are modern classes, which may be watched for future developments.

Propagation. By seeds, cuttings, and division. If seed is sown in pots or boxes of gritty soil in winter, put in a warm frame or house, the seedlings pricked out, hardened in a cool place, and planted out in rich soil in June, they will flower the same year. The flowers will be good or bad from the florist's point of view, according to the quality of the strain sold by the seedsmen. A beginner who wants to be sure of a good type will do well to buy plants of recognised varieties in spring for June delivery. He can increase these by cuttings the following spring if he likes to lift the tubers in autumn, store them in a dry, frostproof place for the winter, and put them in a warm, light place in March; for they will push up young shoots which can be taken off at 3 ins. long, inserted singly in small pots, placed in a warm house or frame, and covered to exclude air. Propagation by division can be effected by separating the tubers that form the rootstock from each other, starting them in pots or boxes, and then planting them out.

Soil. Dahlias love a deep, fertile, moist soil. The ground should be dug and manured a few weeks before planting, to allow for settling. Water and liquid manure will be helpful in dry weather. If they grow slowly at first, dissolve an ounce of nitrate of soda in a gallon of water and give the soil a good soaking.

Pruning. If the branches threaten to become thick some of them should be cut out, as it is desirable to keep the centre of the bushes open. For show flowers from 5 to 6 main branches will suffice.

Earwigs. These must be trapped with hollow Bamboo or Bean stalks, or with small pots filled with hay.

Staking. This must be thorough. It is best to fix strong stakes an inch square and 5 to 6 ft. long when planting. They may be painted green and the base tarred. The tying should be secure.

Daisy. See remarks under Bellis. The giant white, pink, and crimson Daisies offered by seedsmen are excellent for spring beds and borders.

Damask Rose. See Rose.

Damask Violet or Dame's Violet. See Hesperis.

Dame's Rocket. See Hesperis.

Damping-off. A phrase used by gardeners to describe the collapse of seedlings at the surface of the soil. It is directly caused by a fungus, but indirectly by too much moisture and insufficient air. Seedlings are peculiarly liable if the seed has been sown too thickly, whereby they are crowded in their early stages. Thin sowing and early thinning are, therefore, important too. Indeed, with ample ventilation and care in watering, damping-off can generally be avoided. See also Watering.

Damson and Bullace (Prunus insititia). The Damson is one of the hardiest of fruits, and on that account half-standard or standard trees are often planted 10 ft. apart on the outside of plantations, in order to serve as a wind-break and to protect more valuable trees.

The fruit is useful for stewing, and also for preserving; it is less luscious than good Plums. The remarks on culture made under Plum apply to Damson. It needs very little pruning when once in bearing. Bradley's King, the Merryweather, and Farleigh are good varieties. The Bullace is an inferior Damson, and need not be grown.

Danae (dā-nae. Ord. Liliaceæ). The species Laurus (Ruscus racemosus), a hardy Bamboo-like evergreen shrub growing 3 or 4 ft. high, is the Alexandrian Laurel. Plant in autumn and spring. Ordinary soil. The shoots are useful for mixing with cut flowers in bowls and vases.

Dandelion (Taraxacum officinale). The common Dandelion is, of course, a weed; but the forms selected by seedsmen are worth growing to provide a component for salads. The method of culture is to sow the seed in drills a foot apart in April, thin the plants till they stand clear of each other, and let them grow until autumn, when the roots are lifted and stored. They may be forced at intervals in a dark place throughout the winter in the same manner as Seakale. Dandelions as lawn weeds need rigorous control. Ordinary dressings with lawn sand are not of much use. Spudding-out is better, but tedious. A few drops of carbolic acid on the crown of a decapitated plant will often kill the root.

Daphne (dăph-nĕ. Ord. Thymelaeaceæ). Pretty dwarf shrubs with fragrant flowers, which are borne in late winter and early spring. Some are evergreen and others deciduous. Blagayana is a spring-blooming trailer with sweet white flowers, suitable for the rock garden. Cneorum is also an evergreen trailer, and produces its fragrant pink flowers in spring; there are large-flowered varieties called grandiflorum and major, and also one with variegated leaves. Mezereum (the Mezereon) is a great favourite, although not evergreen; its pinkish flowers come in late winter before the leaves, and are deliciously perfumed; there are white and other varieties, including a late summer bloomer. Odora (indica) is evergreen, and its purple flowers are very sweet; it should be grown in a greenhouse; Mazelli, white or blush, is probably a variety of it; it blooms earlier, and is also sweet. Retusa is a modern Chinese evergreen species with pink flowers in May.

Compost. Daphnes do well in peat, but a liberal addition of loam should be made for Mezereum.

Propagation. The trailers are propagated by layering in autumn, the others by cuttings under a bell-glass in autumn, in sandy peat. In nurseries grafting on to D. Laureola, the Spurge Laurel, is practised. Plant in autumn.

Darlingtonia californica (darling-tŏ-nia. Ord. Sarraceniaceæ). An interesting half-hardy plant suitable for outdoor culture in a peaty bed in mild districts, but otherwise needing glass shelter. It loves moisture. The green, yellow, and red flowers are produced in spring. It may be propagated by division when it starts growing.

Date Palm. See Phoenix dactylifera.

Datura, Thorn Apple (dă-tū-ra. Ord. Solanaceæ). Although poisonous plants, these are worth attention for their beautiful flowers. Fastuosa is an annual, growing about 2 ft. high and producing blue and white

flowers in summer; there are several varieties, including a double. Suaveolens is a beautiful greenhouse shrub, with large white fragrant flowers in August; it is sometimes met with in gardens under the name Brugmansia suaveolens. Meteloides (Wrightii) is a greenhouse shrub with white flowers in early summer. Stramonium, which grows 2 ft. high and produces white flowers in August, is the Thorn Apple, the large, spiny fruit of which is familiar in autumn; it is a British plant.

Propagation. The annuals are raised from seed in spring, the shrubs by cuttings under a bell-glass in spring or summer, with bottom heat. Sandy loam suits.

Daucus. The species Carota (Ord. Umbelliferæ) is the ordinary kitchen garden Carrot, which see.

Davallia, Hare's-foot Fern (dă-văll-ia. Ord. Filices). A large genus of ferns, several of whose members are very handsome in pots and hanging baskets in warm greenhouses. They thrive in loam and leaf-soil, with a little peat and sand. Add Sphagnum moss for basket plants. Propagation is by spores (see Ferns), and division of the rhizomes or creeping stems (the likeness of these to a hare's foot has given the popular name) in the case of canariensis, which will thrive in a cool greenhouse or room. They all love moisture. The " fern balls " seen in shops are made of the pliable dry rhizomes of D. bullata Mariesii packed with Sphagnum moss. A few of the best species are canariensis, dissecta, elegans, hirta cristata (Microlepia hirta cristata), and pallida (Moorei, Mooreana).

Davidia (dā-vid-ia. Ord. Cornaceæ). The species involucrata is a handsome deciduous tree growing up to 30 ft. high in Europe. Its beauty lies in the white bracts. It is nominally hardy, but in cold districts might be given a sheltered spot. Ordinary soil.

Day Lily. See Hemerocallis.

Dead Nettle. See Lamium.

Decaisnea (de-cāis-nea. Ord. Berberideæ). A small genus of deciduous shrubs, of which Fargesii, from Western China, feathery leaves and yellow flowers in May, followed by violet fruits, height 6 to 8 ft., is of interest. It is not perfectly hardy, and if grown outdoors should have a sheltered place in sandy loam. Propagation is by seeds or cuttings under a bell-glass or hand light.

Deciduous. A term applied to shrubs or trees which shed their leaves annually.

Deciduous Cypress. See Taxodium.

Dehiscence. The opening of a pod or fruit to shed its seed.

Delphinium, Larkspur (dĕl-phĭn-ium. Ord. Ranunculaceæ). A large and important genus of hardy herbaceous plants, valuable for beds and for colour groups in large borders.

Annuals. Of the species, Ajacis is the annual Rocket Larkspur, and Consolida is the parent of the annual Branching Larkspur. The variety of the latter called roseum is a charming plant, growing about 2 ft. high in ordinary soil, blooming profusely for a long period, and having a very pretty rose flower. It is quite good enough for a bed and in any case is a very useful plant to raise in a frame, prick off into boxes, and keep at hand for whatever emergency may arise, as it can be planted out in June if necessary. There are also red, carmine, blue, and white forms. The seedsman's " Hyacinth-

flowered" Larkspur is a dwarf form of the Rocket, and of this also there are several colours, including different shades of blue.

Annual-Biennials. Pretty as they are, it is doubtful if they are in such demand as they once were, owing to the introduction of some dwarf forms of the perennial species grandiflorum, notably Azure Fairy, Blue Butterfly, Liza Van Veen, and Cineraria. These grow little more than a foot high in ordinary soil, and bear their charming blue flowers in profusion over a long period. What is more, they lend themselves to culture either as biennials or as annuals. They flower the same year as sown if put into a frame in March, but if preferred, they may be sown outdoors in June, and treated as biennials, when they usually flower somewhat earlier (in the following year of course) and grow a little taller.

Perennials. It is, however, the Delphiniums proper—the tall and noble plants of the herbaceous border which flower so gloriously from June onward—that mark the genus as truly great. These have sprung from such species as cheilanthum, elatum, formosum, grandiflorum, and peregrinum, which are not much grown in gardens nowadays. Owing to the forky nature of the rootstock, the Delphinium is not the best of plants to divide, and as growers find that it gives good spikes year after year if planted in the first place in rich soil, and afterwards top-dressed every two or three years, it is not frequently disturbed. However, seed of several of the best named Delphiniums is available and amateurs ought to take advantage of the opportunity of getting a liberal stock at small cost. In this connection, it is worthy of note that the beautiful medium grower Belladonna, which was barren in its earlier years, has seeded, and several new forms of it have been raised. The raiser of named varieties from seed must expect a little variation in colour. How beautiful strong clumps are everybody knows, but it is not every grower who appreciates the advantages of cutting back after flowering and watering with liquid manure to force successional spikes. Stake securely in good time. After cutting down in autumn cover with ashes to repel slugs.

Species. Nudicaule, a perennial growing about 18 ins. high, with scarlet flowers in summer, is used in borders. Cashmirianum, 18 ins., blue, perennial, and cardinale, 1 ft., scarlet, annual or biennial, are among the other species grown. Zalil (sulphureum), yellow flowers in summer, 6 ft., is a beautiful perennial, but needs care. It should be grown in a sunny, sheltered place in well-drained loamy soil. Best grown from seeds in heat in spring.

Dendrobium (den-drō-bium. Ord. Orchidaceæ). A large and beautiful genus of Orchids, requiring a warm house. In the growing season they enjoy abundance of heat and moisture, but they may be kept cooler and drier when growth is mature. They may be grown in pots or baskets, and should be potted when new growth begins. Use crocks liberally, and pack a mixture of fibrous peat and Sphagnum moss about the roots. The erect growers, such as nobile, thyrsiflorum, densiflorum, and fimbriatum, may be grown in Orchid pots; but those of pendulous habit are best in baskets. The winter temperature may range from 50° to 60°, spring 60° to 70°, summer 65° to 85° (with sun heat), autumn 60° to 70°.

aureum, red and yellow, winter, sweet.
Brymerianum, yellow, winter.
densiflorum, orange, spring.
fimbriatum oculatum, orange and maroon, spring.
formosum giganteum, yellow and white, spring.
infundibulum, orange and white, early summer.
nobile, purple, rose, and white, winter.
Phalaenopsis, mauve, autumn.
Pierardii, white, spring.
speciosum, buff, winter.
superbum, purple, spring.
Wardianum, purple, orange, and white, winter.

There are many hybrids, which are seen at the principal shows and in the collections of specialists. For details of parentage a modern work on Orchids should be consulted.

Dentaria. See Cardamine.

Deodar. See Cedrus.

Desfontainea (dĕs-fŏn-tā-nia. Ord. Loganiaceæ). There is only one species, and that is spinosa, a dwarf hardy evergreen shrub producing beautiful scarlet and yellow flowers in summer. It is well worth including in the shrubbery, near the front, and it is not particular as to soil, so long as the ground is not stiff and damp. It is suitable for pot culture. Propagation is by cuttings in a mixture of loam and peat, with sand, under a bell-glass, preferably with bottom heat.

Deutzia (deūt-zia. Ord. Saxifrageæ). A valuable genus of deciduous shrubs, quite hardy, but in one or two cases so early in bloom as to have the flowers injured by late frosts. This renders it desirable to plant them where they will have shelter from other shrubs. They are quite easy to grow, thriving in ordinary soil.

Species. Gracilis is sold by bulb-dealers in autumn in the form of prepared roots, which are put in 6-in. pots and grown for flowering in the greenhouse in winter and spring; there are cream, pink and rose forms. Crenata flore pleno, double white and double pink, is the best of the garden kinds; it is an early and profuse bloomer. The old wood may be pruned out after flowering, and the young, of which there will be abundance if the soil is good, retained for the following year. Lemoinei is a dwarf white hybrid with many fine forms, such as Avalanche and Boule de Neige. Scabra is a tall, strong species. Discolor and its forms are also good.

Modern introductions from China include Veitchii, pink; scabra latiflora, white; setchuanensis, white; Vilmorinae, white; and Wilsonii, white.

Propagation. By cuttings of young wood removed with a heel in spring, and inserted in sandy soil. They root best when kept close. Or division may be practised when growth starts.

Devil in the Bush. See Nigella hispanica.

Dianthus (dī-an-thus. Ord. Caryophylleæ). A most valuable genus, giving us, as it does, the Carnation (see Carnations), the Pink (see Carnations and Pinks), the Picotee (see Carnations), the Indian Pink (see Biennials), and the Sweet William (see Biennials and Sweet William); in addition to many beautiful species suitable for the

rockery. D. caryophyllus is the Carnation, D. plumarius the garden Pink, D. barbatus the Sweet William,, and D. chinensis the Indian Pink.

Alpine Species. The following are the best alpines; all thrive in sandy loam in crevices: alpinus, red, May and June, 3 ins., top-dress annually with fresh soil; caesius, the Cheddar Pink, pale pink, May to July, 6 ins., enjoys limestone chips, grandiflorus is a large form; cruentus, scarlet, July; deltoides, the Maiden Pink, pink, June, 9 ins.; frigidus, May, rose, 3 ins.; glacialis, red, June, 3 ins., likes a sunny aspect and a gritty soil containing leafmould; neglectus, rose, May, June, 3 ins.; superbus, white, summer, 18 ins.; and subacaulis, May, rose, 2 ins. Atkinsoni, May, 9 ins., crimson, a hybrid, is brilliant, and likes shade, if stock is wanted the flowers must be removed to encourage growth. Rupicolus is a rare Sicilian species with red flowers in June, 1 ft.

Diascia (dī-ā-scia. Ord. Scrophularineæ). One species is esteemed, both for greenhouse and flower-garden culture, and that is Barberae, a half-hardy annual with rosy flowers in early summer, growing about 1 ft. high. Sow in pots or boxes in spring, prick out 3 ins. apart in boxes, and plant out in May or June. Ordinary soil.

Diatoms. Unicellular plants growing in water and moist soil. The walls are encrusted.

Dibber, Dibble. A short pointed wooden tool useful for planting greens. It can be purchased, or made from the handle of a broken fork or spade, cut down and pointed.

Dicentra (dī-cen-tra. Ord. Fumariaceæ). The old and popular name is Dielytra. Spectabilis, with its beautiful pink pendent flowers, is much the most popular species, and is good both for herbaceous borders and pots. See cultural remarks under Dielytra. Eximia, 1 ft., purplish red; and formosa, 9 ins., bright red, are worth growing in the herbaceous border. They like a fertile loamy soil, and are easily increased by division in spring.

Dicksonia (dick-sō-nia. Ord. Filices). A genus of handsome ferns, some of which are classed with the tree ferns. They thrive in a compost of 2 parts loam, 1 leafmould, and a liberal dash of sand. Propagation is by spores (see Ferns). Like most ferns, they enjoy abundance of water. Antarctica is the principal species.

Dicotyledons. Plants having 2 seed-leaves, as in Radish, Pea, etc. See also Monocotyledons.

Dictamnus, Bastard Dittany, Burning Bush (dĭc-tăm-nus. Ord. Rutaceæ). The species Fraxinella, the Burning Bush or Bastard Dittany, is interesting on account of the stems being covered with resin, which burns if touched with a lighted match at night. It is a hardy herbaceous plant, bearing its white flowers in late spring. It conforms to the general treatment of its class, but does not lend itself to division, and may therefore be propagated by seed. The purple is a variety, although the two are often grown in the reverse way, i.e. the purple as the species. Giganteus (caucasicus) is a large form.

Didiscus caeruleus (did-īs-cus. Ord. Umbelliferæ). This plant, the Trachymene caerulea of botanists, is an Australian annual with blue flowers in summer, growing about 18 ins. high. It is worth growing in the garden, and may be raised from seed in a greenhouse in

spring, the seedlings being hardened in a frame for planting out in May.

Dieffenbachia (diēff-en-bāch-ia. Ord. Aroideæ). Handsome foliage plants, suitable for warm houses. A compost of loam, with a third of peat and leafmould, and some sand, suits them. They have a distinct growing season, during which they must have abundance of moisture, both at the root and in the atmosphere; less water will be needed when they go to rest in autumn. They should be shaded from hot sunshine. Cuttings of young shoots will strike in heat in spring, and so will pieces of stem. Three of the principal species are Chelsoni, Imperator, and picta.

Dielytra, Lyre Flower. The popular species spectabilis is the well-known Bleeding Heart, or Lyre Flower, which has drooping, lyre-shaped, coral-pink flowers on long pendulous stems. It succeeds in sheltered places out of doors if roots are planted in autumn. It is much used for greenhouse work, and answers well in 6-in. pots if potted in autumn, kept cool through the winter, and given a warm greenhouse, light, air, and abundance of water in spring. Loam, with a fourth of leafmould and some sand, suits. See also Dicentra.

Diervilla, Bush Honeysuckle (dīer-vill-a. Ord. Caprifoliaceæ). These are amongst the most beautiful of deciduous shrubs, and should be grown in every garden. Thriving in almost any well-drained soil, there are few places in which they will not succeed. In deep, friable, manured ground, and with adequate moisture, they will throw up a considerable number of shoots every year, and the best placed of these should be selected for a well-shaped bush, the others being removed after flowering, as the new shoots will bloom well the following year. Increase may be effected by inserting cuttings in sandy soil under a handlight in spring. Rosea (florida or amabilis) is the principal species; it has rose flowers in spring. Abel Carrière, Eva Rathké, and Van Houttei are three fine varieties. They are generally offered by nurserymen, and grown in gardens, under the more popular name Weigela.

DIGGING

The fertility of the soil turns greatly on the tillage, and proper digging has great influence. The digger should have both spade and fork, made of good steel. In some states of the soil the spade may be the better implement, in others the fork; experiment quickly decides which should be chosen. Ground is best dug when damp, but not sodden with recent rain. The blade or prongs should be driven in with the foot at an angle of about 45°, the handle then depressed, the lower hand slid down to the base, and the portion lifted and turned over. It is well to throw it a little forward in turning, so as to keep a small trench open, into which the manure can be placed. By working in a straight line across the piece, and digging evenly, a perfect level is maintained.

Many diggers begin digging a piece of ground by taking out a " spit " of soil across the piece to the width of 1 ft., and wheeling it to the other end, so forming an open strip, which can be maintained to the end, where material is at hand to fill up with.

Alternatively, the piece of ground to be dug can be divided into sections, and each section further divided into two equal parts longitudinally. A garden line should be set along the centre, and then the spade can be run along the side of the line to make a mark and the line itself removed. Each section thus marked out, it is not necessary to wheel the soil from the first trench to the other end of the section; it can be simply laid in a heap at one side of the mark. The digger works down the other side, and having an empty trench at the end of the section, fills it with soil from the other. The section is completed by working up the other side of the mark, and at the end the last trench can be filled with the soil removed from the first.

In either case annual weeds should be buried as the work proceeds, perennial ones forked out, dried, and burned.

The foregoing is Digging put briefly. Let us, however, go a little into detail with respect to digging tools and the best method of handling them, for digging may be either easy and healthful or hard and injurious.

It is not the size of a spade (or fork) which counts, but the quality of the metal and the balance. There are large spades which work lightly, and there are small spades which work heavily. There are spades which cut the soil as the stem of a yacht shears the water; and there are spades which grind and drag with the dull inertia of a barge. A good spade will get brighter and brighter the more it shears the soil, and the edge will get sharper.

The digger soon learns to savour the joy of the good spade, especially when he has learned the labour-saving knack which becomes as natural as the feathering of an oar. It is worth acquiring, because it ensures a maximum of work with a minimum of exertion. The shank of the spade is not gripped tightly by the lower hand with the palm upward, as practised by many diggers, but is held lightly in the tips of the fingers with the palm downward. Observe, held lightly. And the same light grip suffices when the laden spade leaves the soil. How can finger-tips hold a spade containing several pounds of soil? Here comes in the balance of the spade and the levering action of the upper hand. The latter begins to sink backward and downward as soon as the spade has been driven in, and the blade rises automatically, full from top to bottom. At the moment when it comes clear, the handle is horizontal and what a moment before was the upper hand has sunk so low as to be almost touching the ground. With a slightness of effort which surprises the worker, the laden spade is raised a few inches from the ground by the fingers of the other hand and is poised for the turn. And no small part of the value of the palm-down method of digging lies in the facility with which the soil is turned as it is discharged from the spade—as easily as a scull is feathered by practised hands and by much the same wrist action. A slight twist of both wrists and the soil has gone, without a jerk, without a push, without a conscious effort of any kind. The twist frees the spade and turns the soil over with the same action, which is as it should be, because it does not suffice to push or shake the soil off without reversing it.

In conjunction with thin slices, the palm-down method enables the least muscular person to dig for hours without undue fatigue when once the first stiffness and want of " tone " have disappeared,

as they will speedily do, because the stresses are spread over the back and shoulder muscles. If the digger grips the shank of the spade tightly with the palm upward, encircling it with his fingers, and lifts it when laden without the levering down of the other hand, the stress will fall on the muscles of the upper arm and chest, putting a severe strain on the heart; and the tiredness which follows will not be merely a healthy muscular fatigue, but a weariness approaching exhaustion, followed by several days of lassitude. The consequence will be that instead of the next bout being pleasantly anticipated with a feeling of mastery, it will be dreaded as a painful servitude. Such is the organic difference between scientific and unscientific digging.

But everything may be spoiled by taking too thick " bites " or slices, which the gardener terms " spits." The thickness of the spit can be regulated at will, and the weight of each spadeful which is lifted and turned depends upon the decision of the digger. The beginner should feel his way to easeful competency in digging by exercising severe restraint in this matter. For example, while a thoroughly experienced and hardy digger can afford to take thick bites of as much as 7 to 8 ins., a beginner should never attempt extremes under the delusion that he will get through the work quickly. He should start at 4 ins. and may work by degrees from spits 4 ins. to spits 6 ins. thick. He must not, however, vary the thickness in one particular line, or his work will become uneven. On the contrary, he should take care that each spit in a line is of the same thickness, and by drawing the edge of the spade along the line of the " cliff " after each discharge, he will have no difficulty in keeping a straight line. With each spit cut of the same width and discharged by the same style of action, not only the digging face but also the surface of the dug soil will be perfectly even and level. Alternate hillocks and hollows are the signs-manual of defective digging.

There may be states of the soil when a fork will prove to be more suitable to the task than a spade. Only experiment can settle this point. The experienced digger likes to have both tools at hand, so that he can be free to make a choice. On very light and also on very heavy soils the spade will probably prove to be the more suitable implement; on the many differing types of soil between the two extremes, it will be surprising if the fork does not sometimes score. The principles of good digging apply equally to both fork and spade.

The maintenance of a sufficient and even depth and the proper utilisation of the manure are both matters worthy of consideration. Depth can be positively ensured by working on a systematic method. With respect to applying the manure, the average digger likes to spread it evenly on the ground at the rate of about three heaped barrow-loads per square rod and turn it under as he digs. The drawback to this plan is that the loose, greasy manure tends to clog both boots and tool, and many prefer to keep it in handy heaps and fork it into the trenches. By adopting this plan one has a cleanly working and gets the manure well buried, so that when drill-drawing begins no tufts of manure appear and impede sowing. Of course, labour is reduced if artificial manure is used, because it need only be

dusted on the ground and dug in, or in the case of Potatoes spread in the drills when planting takes place. And artificial manure is permissible when the ground has been dunged for several years. For exhausted soil, yard or stable manure is better. See Manures and Manuring.

"Double Digging" is sometimes spoken of, and by this the gardener means digging to double the ordinary depth.

The digging-up of the bottom soil is really neither more nor less than the process commonly called "bastard-trenching." When a piece of ground is dug two spits deep instead of one, and the layers are kept in the same position, it is "bastard-trenched." In ordinary trenching the positions of the two spits are reversed, the top soil going down and the under spit coming to the top. Bastard-trenching is a first-class method of cultivating the ground. It is better than the best digging, always provided that it is done thoroughly, each of the two spits being turned to an honest depth. A lot of garden rubbish can be disposed of in or on the upturned second spit.

Moreover, it is the proper place for turf when pasture is being broken for gardening. The pieces can be laid on it grass-side downwards and covered with the top-spit of soil. No manure is required for at least a year, because the rotting turf provides food. Half-covered turf is apt to be a nuisance when the time comes to draw drills and sow seeds. Weeds should be covered deeply for the same reason.

See also Manures, Soils, and Bastard-trenching.

Digitalis, Foxglove (diji-tā-lis. Ord. Scrophularineæ). The Foxglove is an old favourite, and seedsmen now sell splendid strains of the old species purpurea. There is a form (campanulata) which bears flowers at the top of the stem. Of the other species, ambigua is one of the best. It has yellow flowers. The Foxglove is a biennial (see Biennials) and seed should nominally be sown each year to give flowering plants the next, but every grower knows that the plants seed themselves freely and that seedlings come up in abundance and can be easily transplanted, so that annual sowing is unnecessary. They are good plants for the wild garden, and also (with restrictions) for the backs of herbaceous borders.

Dill. A herb (Anethum graveolens) used for flavouring soups and sauces, among other purposes. Sow in spring.

Dimorphanthus. See Aralia.

Dimorphotheca (dī-mōr-phō-thē-ca. Ord. Compositæ). An unimportant genus on the whole, but the species aurantiaca, which grows about 1 ft. high and bears a profusion of orange flowers in summer, has come to the front in recent years. It may be grown as a half-hardy annual, the seed being sown under glass and young plants put out from boxes in May or June.

Dioecious. Male and female flowers on separate plants, as in Aucuba, Hop, Willow, Yew, Juniper, Poplar, Sea Buckthorn, Sedges, etc. Lychnis diurna (dioica), the native Red Campion, of which the double form is grown in gardens, is generally dioecious when growing wild.

Dionaea, Venus's Fly-trap (dī-ō-nē-a. Ord. Droseraceæ). The only species, muscipula, is interesting from the fact that the bristles on

the leaf lobes are irritable, and when a small insect alights the leaf closes over it. It should be grown in a greenhouse, in a compost of peat and Sphagnum moss. As it loves moisture the pot may be stood in a saucer of water. The white flowers are borne in July. Propagation is by seeds or division.

Diospyros. See Persimmon.

Dipelta (dī-pel-ta. Ord. Caprifoliaceæ). Deciduous shrubs allied to Diervilla (Weigela) and suited by the same treatment (see Diervilla). The best-known species are floribunda, pink, white, and yellow, height 4 ft.; and ventricosa, brown, white, and cream. Yunnanensis, pale pink, is a Chinese species of more modern introduction.

Diplacus (dĭp-la-cus. Ord. Scrophularineæ). One species is grown, and that is glutinosus, which botanists now call Mimulus glutinosus. It is a greenhouse shrub, with small orange flowers and sticky foliage. Loam, with a fourth of leafmould and some sand, suits it. Propagation is by cuttings under a bell-glass in summer.

Dipladenia (dipla-dē-nia. Ord. Apocynaceæ). Very beautiful evergreen twiners, producing abundance of large brilliant flowers in a warm greenhouse. They are sometimes trained up pillars, but more frequently on balloon-shaped trellises fixed in large pots; when the framework is well covered and the plants are in full bloom the former make lovely objects. Peat and loam, the former preponderating, with sand, suit them. Repotting is best done in spring, when growth begins. When in full growth they will delight in large quantities of water, but after flowering the supply may be reduced. A moist atmosphere should be maintained by syringing.

Propagation. By cuttings of the young shoots in spring, preferably put in a propagating case, or in bottom heat with a bell-glass over them.

Species. Amabilis, rose; boliviensis, yellow and white; and splendens, carmine, are three of the best kinds.

Diplopappus (dip-lō-pappus. Ord. Compositæ). An unimportant genus, save for the species chrysophyllus, the Golden Heath, which botanists now call Cassinia fulvida. See Cassinia.

Disa (dī-sa. Ord. Orchidaceæ). A small genus of Orchids, not much grown except in the case of grandiflora, which is a great favourite, partly because of its brilliant colour, and partly because it will thrive in a cool house. It should be grown in pots, liberally crocked, and filled with a mixture of fibrous peat and Sphagnum moss; a little charcoal may be added for sweetening. Early winter is the period for repotting. Little water will be needed until the plants are seen to be rooting freely, when regular and abundant supplies must be given; at the end of the growing season the supply must be reduced and the plants rested. Propagation is by division when repotting. There are several varieties of grandiflora, and superba is very good.

Disbudding. A term applied to the thinning out of growths or flower-buds, in the former case to prevent too much wood, in the latter to get fewer but finer flowers. See Fruit, Carnations, Chrysanthemums, Dahlia, etc.

Diseases. The diseases to which plants are subject are so numerous and varied that they cannot be dealt with collectively. See the various plants concerned.

Dittany. See Dictamnus.

Dodder. A parasitic plant devoid of chlorophyll and unable to produce absorbent organs in the soil. One species preys on Furze, Heath, and Thyme.

Dodecatheon, American Cowslip (dŏ-de-cătheon. Ord. Primulaceæ). These pretty flowers thrive in sandy peat in cool, shady spots on the rockery or in the border. Propagation is by division or seeds in spring. There are many forms of D. Meadia, and giganteum is one of the best. A stock should be obtained in autumn through a bulb-dealer.

Dog Rose. See Rosa canina.

Dog's Tooth Violet. See Erythronium.

Dogwood. See Cornus.

Dolichos Lablab (dŏl-i-kos. Ord. Leguminosæ). A twining plant with purple flowers in summer, generally raised from seed in a warm house and potted for greenhouse cultivation.

Dondia (don-dia. Ord. Umbelliferæ). Nurserymen offer the species Epipactis, which botanists call Hacquetia Epipactis. It is a pretty hardy perennial, with greenish-yellow flowers in winter and early spring. Height 6 ins. It may be grown on the rockery in good loamy soil. Propagation is by division of strong tufts in spring.

Doronicum, Leopard's Bane (dŏr-ŏn-icum. Ord. Compositæ). This early-flowering genus of yellow hardy herbaceous perennials is generally represented in gardens by the two species austriacum and caucasicum, both about 1 ft. high; and by the variety of plantagineum called excelsum or Harpur Crewe, which is about 2 ft. high when in full bloom. The latter is a good plant, flowering profusely in May, but its beauty is fleeting. Ordinary soil. Propagation by division in autumn or winter.

Douglas Fir. See Abies and Pseudotsuga Douglasii.

Dove Orchis. See Peristeria elata.

Downingia. See Clintonia.

Draba, Whitlow Grass (drā-ba. Ord. Cruciferæ). The species aizoides, with its pretty rosettes of lance-shaped leaves and its yellow flowers, is favoured for the rockery, where it blooms in spring. Ordinary soil. Propagation is by seeds and division. There are many other species, among which bruniaefolia, yellow flowers, mossy habit, 3 ins., may be mentioned.

Dracaena (dra-sæ-na. Ord. Liliaceæ). Handsome foliage plants, some nearly hardy, others requiring a hothouse. With care some kinds can be kept healthy in living-rooms, the principal requirements being proper watering (see Watering), a weekly sponging with tepid water, ventilation without draughts, and a light position. Repotting should be done in spring when necessary, but 6-in. pots are generally large enough, and in preference to shifting on, the balls can be reduced, and the plants put in the same size of pot, with some fresh soil well rammed down around the ball. Loam, with a third of decayed manure, and sand, suit. When the plants get leggy they can be shortened like Crotons, which see. Propagation is effected by cutting up pieces of stem in spring, each with a joint, and laying them in moist soil or cocoa-nut-fibre refuse in bottom heat. As we have seen under Cordyline, these two genera are related, and

several plants which, strictly speaking, are Cordylines, are grown as Dracaenas. The following are some of the best Dracaenas:

Australis, Baptisti, Bruantii variegata, Chelsoni, Goldieana, indivisa, and Lindeni.

Dracocephalum, Dragon's Head (drā-kō-cĕph-a-lum. Ord. Labiatæ). Pretty summer-flowering hardy herbaceous plants, thriving in ordinary soil and propagated by division in spring. Ruprechti, lilac, 1 ft.; speciosum, reddish, blue spots, 18 ins.; and Ruyschianum, with purplish-lilac flowers in early summer, growing about 2 ft. high, are three of the best. Grandiflorum, blue, 6 ins. high, is suitable for the rockery. Forrestii, violet, 1 ft.; and Isabellae, 18 ins., bluish-purple, are two modern species from the Far East.

Drainage. This subject may be considered under two heads horticulturally, the drainage of garden ground and the drainage of flower-pots.

Pipes for draining land should not be laid until the necessity has been proved, as the process is laborious and expensive; moreover, it is possible to make ground too dry. A simple test is to dig holes 30 ins. deep in winter, cover them to exclude rain, and see if water rises into them and stands after a spell of wet weather. If water lodges in the upper strata of soil the latter is likely to become sour, stiff, and unsuitable for crops. Before laying drain-pipes, look out for a spot where there is a fall, and let the main drain lead to it. If it is a ditch or river, the water is carried off the place, otherwise a small pond may be formed in the grounds and made ornamental (see Flower Garden: The Water Garden). The trenches for the pipes may be 30 to 36 ins. deep and 20 ft. apart in medium ground. Two-inch earthenware drain-pipes 12 ins. long are suitable; the ends may be left open. Care must be taken that the bed of the trench is perfectly firm and level. The pipes may be laid in diagonal lines leading to the main drain. With a proper fall and outlet, water cannot lie near the surface in ground thus treated.

With respect to draining flower-pots, the pots are provided with a bottom-hole in order to allow superfluous water to escape, but in the absence of drainage material the soil would fall through. By laying crocks (broken flower-pot) over the hole the soil is upheld, but water is allowed to escape. It is best to choose one large piece for the bottom layer, and place it concave side downward, then cover with smaller bits arranged so as to overlap. With a little clean moss or a few flaky portions of compost over all, perfect drainage is provided, but a few pieces of charcoal are an improvement. Pots of Orchids are filled two-thirds full of drainage, to allow for the large quantities of water needed.

Drill, Drilling. There are two methods of sowing seeds in the garden, one in shallow drills (drilling), the other over the surface (broadcasting). The great majority of vegetable seeds are sown in drills, more or less deep according to the size of the seed, drawn along a garden line with the edge of a hoe or the end of a rake. The soil should be raked down well before the drill is drawn, in order to get a fine tilth, as this facilitates sowing at a suitable and even depth. For the majority of vegetable and flower seeds a drill about 1 in. deep suffices. Large seeds may be sown 2 to 3 ins. deep.

Dropwort, Spiraea Filipendula. See Spiraea.

Drosera, Sundew (drŏs-era. Ord. Droseraceæ). Interesting insectivorous plants. Rotundifolia is a British plant, covered with glandular hairs that sparkle with moisture. Under cultivation it should be given a cool, moist spot, with peaty soil. Propagation is by division. Binata and filiformis are pretty exotic species. All may be grown in pots for the greenhouse if desired, peat with a surfacing of Sphagnum moss being used.

Drupe. A fleshy fruit with a hard stone, as in Cherry, Peach, Plum, etc.

Dryas, Mountain Avens (drȳ-ăs. Ord. Rosaceæ). The best-known species is octopetala, a British evergreen shrub with white flowers in early summer. A trailer, it is suitable for the rockery. It thrives in loam, peat, and sand, and may be propagated by division in spring.

Dutchman's Pipe. See Aristolochia Sipho.

Dyer's Green Weed. See Genista tinctoria.

E

Earwig. When present in large numbers the earwig is a great trial to gardeners, attacking both plants and flowers. Traps of hay in small flower-pots inverted on stakes should be set. If the contents are shaken out into boiling water the earwigs are killed instantly.

Eccremocarpus (ek-rē-mō-cār-pus. Ord. Bignoniaceæ). The only popular species, scaber (Calampelis scabra), is much esteemed as a trailer, both indoors and out. It produces orange flowers freely in July. It looks well on an arbour. The plant can be treated with advantage as a half-hardy annual, seed being sown in a pot or pan under glass in February, the seedlings set out a few inches apart in a box, and the plants put out in May. Any good garden soil suits it.

Echeveria (ek-e-vē-ria. Ord. Crassulaceæ). These once-popular plants are not much grown nowadays. Hints on species and cultivation are given under Cotyledon, which see.

Echinacea purpurea (ek-in-ā-cea. Ord. Compositæ). This plant, offered by seedsmen, is the same as Rudbeckia purpurea. It grows about 4 ft. high, and has purple flowers in summer. Seed may either be sown in a frame or greenhouse in March or in the open a month later. Subsequently, increase can be effected by division. Ordinary soil.

Echinocactus (ek-in-ō-cac-tus. Ord. Cactaceæ). The principal species are described under Cactus, which see.

Echinops, Globe Thistle (ek-i-nops. Ord. Compositæ). The species ritro is a hardy herbaceous perennial growing about 3 ft. high and resembling the Eryngiums. Its blue metallic flowers are produced in summer. Ordinary garden soil. Propagation is by division in spring, or by cuttings of the roots inserted in sandy soil in a cold frame in spring. Ruthenicus, blue, 4 ft., summer, is also good.

Echinopsis (ek-in-ōp-sis. Ord. Cactaceæ). See Cactus.

Echium, Viper's Bugloss (ĕk-i-um. Ord. Boraginaceæ). The species vulgare is the Viper's Bugloss. It is a biennial, growing about 3 ft. high, and with violet flowers in July. There is a white variety, alba. For culture, see Biennials. Candicans, with rosy flowers; fastuosum, blue, and one or two others, are occasionally grown in the greenhouse.

Edelweiss (Leontopodium alpinum, otherwise Gnaphalium Leontopodium. Ord. Compositæ). A silvery-leaved Alpine with white or creamy flowers, easily grown on the rockery, but the better for protection from rain with a square of glass through the winter. It may be raised from seed in spring, preferably sown in a pan of sandy soil and kept in a warm frame or greenhouse, and the plants hardened in a cold frame before being planted out. Helveticum is the same as alpinum, and himalayanum is a form of it. Aloysiodorum is a rare kind with the perfume of the lemon-scented Verbena.

Edgeworthia (edge-wŏrth-ia. Ord. Thymeleaceæ). The best-known member of this Daphne-like genus of deciduous shrubs is chrysantha

(papyrifera), which bears fragrant yellow flowers in spring, height 2 to 3 ft. It is mentioned as hardy, but is only safe outdoors in mild districts. A mixture of peat and loam suits it. Propagation is by cuttings under a handlight in spring, sandy soil being used.

Edging-iron. A useful tool for trimming grass edges. The steel blade is crescent-shaped, and is mounted on a vertical handle about 1 yard long, with a crosspiece at the top. By its aid lawn-verges can be kept neat; in short, it is a useful complement to the edging-shears. It is also handy for cutting-up lifted turves.

Edgings. There are various ways of providing edgings to beds and borders in order to keep the soil off the walks. Some like Box (see Box), others grass, others tiles. Nothing looks better than a broad band of grass about 2 ft. wide; when regularly mown, the outer edge neatly clipped, and the soil thrown well back from the inner edge, it forms a cool foil both to gravel and flowers. Such a band is best made with turves. Tiles look neat but mechanical; if used, a dwarf plant should be grown near, such as Viola, Virginian Stock, Crocus (for spring), Thrift, or London Pride. A charming edging may be made with stones placed irregularly in a bed of good soil, and the interstices planted with Alpine plants. Perhaps the cheapest edging is one of 6 ins. by 1 in. deal, creosoted. It lasts several years.

Eel-worms. Minute thread-like maggots, which get into the roots of many plants, particularly perhaps Cucumbers, Tomatoes, and Peas. The "nettle-headedness" of certain plants is due to these pests. As they cannot be destroyed in the plants without injury to the latter, gardeners combat them by heating the soil for indoor plants to about 180°. This "sterilisation" enhances rather than reduces its fertility.

Egg Plant, Aubergine (Solanum Melongena). These interesting relatives of the Potato are grown in the larger gardens more, perhaps, for ornament than use, although in France the fruits are cooked. They are tender plants, and although they can be grown out of doors during the warmest part of the year, they are best in pots under glass. The seed should be sown on a hotbed or in a warm house in February or early March, the seedlings pricked off into boxes, then put singly in small pots, and finally shifted to 6-in. pots. They will appreciate liquid manure when the fruit is swelling. For the rest, attention to watering, warmth, and occasional syringing are the principal requirements. Purple, scarlet, and white-fruited varieties are procurable.

Eglantine. The Eglantine or Sweetbrier is Rosa rubiginosa. A low hedge of this fragrant plant in the garden is delicious after rain.

Eichornea (ēīk-or-nea. Ord. Pondeteriaceæ). Aquatics that require a tank in a warm house. Propagation is by division in spring. Speciosa, with blue flowers in summer, is grown a little.

Elaeagnus, Wild Olive (el-ē-ăg-nus. Ord. Elaeagnaceæ). Handsome shrubs, including several evergreens, which, with their green or variegated foliage and berries, are good for winter effect. They are not particular as to soil, and are easily propagated by cuttings in autumn. Angustifolia, deciduous, with yellow flowers in May, followed by silvery fruit, will thrive on sandy soil; macrophylla, evergreen, yellow, autumn bloomer; pungens, leaves silvery below, an evergreen, and its form tricolor or variegata; glabra, evergreen,

white, autumn, and its yellow form aurea; longipes (edulis, multiflora), deciduous, orange-red edible fruits; and argentea, deciduous, silvery leaves, are all good.

Elder, Sambucus (sam-bū-cus. Ord. Caprifoliaceæ). Few small trees are more familiar than the common Elder, with its white perfumed flowers in early summer, followed by black fruits. It is a soft-wooded tree, apt to grow straggly and to be ugly in winter unless carefully pruned. Any well-drained soil suits it. Propagation is by cuttings from which the buds on the lower part have been removed. The common species is S. nigra, but there are several garden varieties of it, such as foliis aureis, golden; and variegata, silvery. Viridis has green and racemosa scarlet berries. Canadensis, cream, 12 ft., does well near water.

Elecampane. See Inula Helenium.

Elm, Ulmus (ŭl-mus. Ord. Urticaceæ). The common Elm, U. campestris, is a good park tree, but not suitable for gardens, partly because the roots ramble afar and impoverish the soil, partly because old trees are apt to cast their branches in summer, and partly because of the noxious drip. They should not be planted near drives because of the branch-casting propensity mentioned. The Elms like a friable, loamy soil. They are propagated by seeds and layers, special varieties by grafting. Two good varieties of the common Elm are antarctica aurea and variegata. The Scotch or Wych Elm (Ulmus montana) is suitable for gardens. The Parsley-leaved Elm is a variety of it (crispa), and the Exeter Elm or Ford's Elm (fastigiata) of pyramidal habit; the Golden-leaved Elm, Dampieri aurea; the Huntingdon or Chichester Elm (vegeta); and the Purple-leaved, purpurea, are also varieties. The Cornish Elm (cornubiensis), a handsome tree, much planted at roadsides in towns, is a variety of Ulmus glabra.

Embothrium (em-bŏt-rium. Ord. Proteaceæ). A small genus of little importance generally, but including one very fine plant in the species coccineum, a half-hardy evergreen shrub which bears clusters of beautiful scarlet flowers in early summer. It grows out of doors in Cornwall and other mild districts. Peat or loam, but preferably a mixture of both, with grit, should be provided. Propagation is by seeds sown in spring.

Embryo. The elementary plant or germ within the seed.

Emmenanthe penduliflora (emmen-ăn-thĕ. Ord. Hydrophyllaceæ). A pretty Californian annual with pale yellow flowers in summer, height 1 ft.; easily grown from seed sown outside in spring. Ordinary soil.

Emmenopterys (emmen-ŏp-ter-ĭs. Ord. Rubiaceæ). The one species is Henryi, a deciduous tree, collected by Mr. E. H. Wilson in China in 1900. A plant from the original supply of seeds had attained a height of 20 ft. at Kew in 1929. It has very large dark green leaves with reddish veins below, and white flowers. No injury occurred in the severe winter of 1928–9. Plant in spring.

Empetrum, Crowberry (ĕm-pĕt-rum. Ord. Empetraceæ). Evergreen shrubs resembling Heaths, and flowering in May. Peaty soil in a cool, moist place suits. Propagation is by cuttings in summer under a handlight. There is but one species, nigrum, with black berries; scoticum and rubrum are varieties of it; the latter has red berries.

Endive (Cichorium endivia). One of the most useful of salads, as it is easy to grow, fairly hardy, and of nice flavour, the touch of bitterness which distinguishes it from Lettuce being agreeable rather than otherwise. A great thing in favour of Endive is that it can be had in use in autumn, winter, and spring, and where salads are much in request it should be sown successionally in spring and summer. It requires substantially the same treatment as Lettuce, namely, a friable, fertile soil, thin seeding in a spare plot, transplanting when 2 or 3 ins. high to rows 15 ins. apart, and finally blanching.

Sowing. The first outdoor sowing may be made in April, and thereafter pinches of seed may be sown at intervals until the end of September. The plants from the earlier sowings will come into use in summer and autumn, those from the late ones in winter and spring. The latter should be made, and the plants put out, on a warm, sheltered border. They pass most winters in safety, but as their numbers are liable to be reduced in a severe one, as many as accommodation can be found for should be lifted in autumn and planted in an unheated frame. These will come in during late winter or early spring, and those left out will be ready, if they survive, early in summer. The summer and autumn plants may be blanched in the same way as Lettuces, namely, by tying the outer leaves up, but not tightly. The winter and spring plants may be lifted and put in a dark place.

Good Varieties. Broad (Round)-leaved Batavian and Green Curled. The former is the more useful, because if abundant it can be used as a vegetable for cooking. It is, moreover, easy to blanch. The Green Curled makes a more graceful salad, and needs less space.

Endosperm. The reserve food tissue found in the embryo-sac of plants. See a modern work on Botany.

English Iris. See Iris.

Enkianthus (enki-ăn-thus. Ord. Ericaceæ). A small genus of shrubs, which includes one or two useful plants. Loam, with a third of peat and some sand, suits them. Propagation is by cuttings in a frame in spring. Campanulatus, with red flowers in July; and japonicus, with white flowers in late winter, are hardy. Albus and recurvus are forms of campanulatus. Palibinii is a modern species with deep red flowers.

Eomecon, Morning Poppy (eo-mē-con. Ord. Papaveraceæ). The species chionantha, with Cyclamen-like leaves and large white flowers in summer, height about 1 ft., is a beautiful hardy perennial, thriving in any good garden soil but liking a proportion of leafmould, and propagated by division of the creeping roots in spring. It may be planted in a sunny part of the rock garden.

Epacris (ē-păc-ris. Ord. Epacrideæ). Beautiful hard-wooded evergreens, but not easy to grow, owing to the hair-like roots being very susceptible to injury. If kept either too wet or too dry they shrivel and the plants die. They ought to be grown in a batch to themselves in a greenhouse, and given careful attention in watering. The pots must be well drained. Fibrous peat and sand make a suitable compost. Propagation is by young tips inserted in sandy peat under a bell-glass in spring or summer. Prune back after flowering. The species are not much grown. Such hybrids and varieties as alba

odorata, white, sweet; autumnalis, red and white, October bloomer; and Devoniana, scarlet, are generally preferred.

Epicattleya (ĕpi-cătt-leya, a compound of Epidendrum and Cattleya, the plants being hybrids between those genera). See Cattleya for culture.

Epidendrum (ĕpi-dĕn-drum. Ord. Orchidaceæ). Graceful Orchids, requiring hothouse culture, and thriving in pots or pans if set high over a mass of crocks and the roots packed with fibrous peat and Sphagnum moss. Large supplies of water must be given during the growing season, but less in the autumn. The following are selected from a large number:

Dellense, hybrid, orange, spring; Medusae, purple, early summer; vitellinum majus, orange, late summer; and Wallisi, crimson, white and yellow, sweet, winter.

Epidermis. The mass of cells below the cuticle which form the skin of a plant.

Epigaea, May-flower (ĕp-ĭ-jē-a. Ord. Ericaceæ). The species repens is a trailing evergreen, the principal charm of which is the fragrance of its white flowers, which are produced in summer. It is hardy, but will not grow in dry, sun-scorched soil. A cool, moist, sheltered place should be found, and peat provided. Propagation is by division in spring.

Epilaelia (ĕpi-lē-lia. Ord. Orchidaceæ). A hybrid between Epidendrum and Laelia. For culture, see Cattleya. Charlesworthii, with scarlet flowers in July, is a good hybrid.

Epilobium, Willow Herb (ĕpi-lō-bium. Ord. Onagrarieæ). Tall, hardy herbaceous perennials. Two of the finest species, angustifolium and hirsutum, both purplish crimson, do well by the waterside. Propagation is by division in spring. There is a white variety of angustifolium. Obcordatum, rose, is a good dwarf species. All thrive in any good moist soil.

Epimedium, Barrenwort (ĕpi-mē-dium. Ord. Berberideæ). Useful dwarf perennials for the shady parts of the rockery, attractive both in leaf and flower. Propagation is by division. They like sandy loam, except alpinum, which should have peat. This species is British, and has red and yellow flowers in May. Macranthum (grandiflorum), with blue and white flowers in spring, is good; violaceum is a dark variety of it. Niveum, white, with bronzy shield-shaped leaves, is charming.

Epipactis (ĕpi-păc-tis. Ord. Orchidaceæ). The North-American species gigantea is a pretty terrestrial Orchid with brownish flowers, 3 ft. high. It may be grown successfully in a moist shady spot. Latifolia (Helleborine) and palustris are British natives.

Epiphyllum (ĕpi-phy̆llum. Ord. Cactaceæ). See descriptive and cultural notes under Cactus.

Eragrostis, Love Grass (ĕra-grŏs-tis. Ord. Gramineæ). The species elegans is a pretty ornamental grass, suitable for cultivation as a hardy annual, being sown outside in spring.

Eranthemum (er-ăn-themum. Ord. Acanthaceæ). Pretty plants for a warm greenhouse. Loam, with a fourth each of peat and leaf-mould, and sand, suits. Propagation is by cuttings under a bell-glass in spring. A little pinching is required to ensure a bushy habit. They should be pruned back after flowering, rested with little water,

then repotted. Andersoni, purple and white; albiflorum, white; and cinnabarinum, scarlet, are useful species. Pulchellum is called Daedalacanthus nervosus by modern botanists. It is valuable as producing its blue flowers in winter and early spring.

Eranthis hyemalis (Winter Aconite). See Aconite, Winter.

Ercilla (er-cill-a. Ord. Phytolaccaceæ). The only species grown is volubilis (spicata), an evergreen clinging creeper with purple, stemless flowers, borne profusely in spring. It is suitable for a wall, on which it may be expected to spread rapidly in good garden soil. Propagation is by cuttings of ripened shoots inserted in sandy soil under a bell-glass or handlight towards the end of summer.

Eremurus (ĕr-e-mū-rus. Ord. Liliaceæ). Tall, hardy herbaceous plants, with handsome spikes of bloom in summer. Fertile, friable loamy soil gives the best spikes, and they may rise 6 or 7 ft. high. Propagation is effected by seeds sown in a greenhouse in spring, but the plants will not flower for 3 or 4 years. The roots are remarkable in shape. They should be planted in autumn, as growth starts early. Guard against slugs in spring. A sheltered place should be provided for these noble plants, as they suffer from strong winds. Himalaicus, white, is a fine species, though not one of the largest. Bungei, yellow, is good. Robustus has silvery-rose flowers, and is very strong; Elwesii, blush, is an early variety of this. Olgae, blush, fragrant, 3 ft.; and Warei, orange-yellow, 4 ft., late-blooming, are also of interest.

Erica, Heath (ĕr-ī-ca. Ord. Ericaceæ). These are amongst the most valuable of evergreens, for in addition to the greenhouse species, they give us such beautiful hardy species as arborea, carnea, cinerea, and mediterranea. The greenhouse species are not easily managed. They are hard-wooded plants with hair-like roots, requiring abundance of water in summer, yet liable to suffer from sodden as well as from dry soil.

Compost. Sandy peat. If repotting is required it should be done towards the end of winter. The old soil should be crumbled from the ball, which should be soaked if dry, and then put into a 6-in. pot and well packed with fresh soil over ample drainage. A greenhouse from which frost is excluded will suit them in winter, when much less water will be needed. They will flower in spring, and may be stood on an ash bed in the open in summer.

Propagation. By cuttings in summer, in sandy soil under a bell-glass.

Greenhouse Heaths

caffra, white, May.
Cavendishiana, yellow, July.
gracilis, purplish-red, March; and its winter-flowering pale pink form nivalis.
hyemalis, rose, winter.
Massoni, red and green, summer.
ventricosa, flesh, late spring (several varieties, such as alba, white; erecta, flesh; and superba, scarlet).

Hardy Heaths

Alportii, rosy crimson.
arborea, white, May, several varieties. "Brier" pipes are made

from the wood. The name has no connection with the hedge Brier, but is a corruption of *bruyère*, the French for Heath.

carnea (herbacea), purple, February, and white variety.
cinerea, crimson, July, many varieties.
lusitanica (codonodes), pink, February.
mediterranea, purple, spring, several varieties.
vagans, purplish-red, autumn, Cornish Heather, several varieties.

Erigeron, Fleabane (ĕ-rij-eron. Ord. Compositæ). Mucronatus, white and yellow, 1 ft., is good; but the most popular species is aurantiacus, which has orange flowers in July, and grows about a foot high; superbus is a fine variety. Speciosus (Stenactis speciosa) is a good plant with violet yellow-centred flowers; height 2 ft., several varieties; Alpinus semi-barbatus (Roylei), blue, yellow centre, 1 ft., is well worth growing. Caucasicus, purplish, 1 ft.; Coulteri, white, 1 ft.; and glabellus, pale blue, 1½ ft., may also be mentioned. The Erigerons are useful hardy herbaceous perennials, as they thrive in ordinary garden soil and are easily increased by division.

Erinus (ĕr-ī-nus. Ord. Scrophularineæ). The only species grown to any extent is alpinus, which bears magenta flowers in May, and is well adapted for the rockery, height 6 ins. It likes well-drained, sandy soil and a warm spot. Propagation is by seed. There are white (albus) and rose (carmineus) varieties.

Eriobotrya, Loquat (ĕrio-bō-trya. Ord. Rosaceæ). The only species grown is japonica, the Loquat or Japanese Medlar, a handsome small tree, 10 to 15 ft. high, with drooping white fragrant flowers in autumn. When grown under glass, clusters of orange-coloured fruits as large as a medium dessert Apple may be produced. If grown outdoors, as is done in the West of England, it should have a sunny wall and well-drained loamy soil. Propagation is by cuttings under a hand light in summer. Photinia japonica is the same thing.

Eritrichium (ĕr-i-trīk-ium. Ord. Borragineæ). The species nanum is a beautiful dwarf plant, giving bright blue yellow-eyed flowers in summer. It may be grown on the rockery, if given a pocket of peat and leafmould, with plenty of grit. Propagation is by division in spring. This lovely plant is not easily grown, but it is worthy of special care.

Erodium, Heron's-bill (ĕr-ō-dium. Ord. Geraniaceæ). Pretty hardy plants, allied to the Geraniums, and suitable for border and rockery. They like a light, friable soil, and may be propagated by seeds in spring. Chamaedryoides (Reichardi), with white, rose-veined flowers in summer, 3 ins.; Manescavi, with purple flowers in June, 1 ft.; and macradenum, violet, with rose veins, June, 6 in., are all good.

Eryngium, Sea Holly (ĕr-ing-ium. Ord. Umbelliferæ). Tall, spreading hardy herbaceous plants, with metallic flowers that, if not beautiful, have quaintness and distinctness. They are not particular as to soil, and are easily propagated by division in spring, or from seeds. Alpinum, blue, 2 ft.; amethystinum, blue, 2½ ft.; Bourgati, steely blue, 2 ft.; maritimum, blue, 1 ft.; Oliverianum, blue, 2 ft.; and planum, blue, 3 ft., are the principal kinds. All flower in summer.

Erysimum, Hedge Mustard (ĕr-īs-imum. Ord. Cruciferæ). Perofskianum, orange, 18 ins. high, July, is a well-known species. It is a biennial, but is generally treated as a hardy annual, the seed being sown outside in spring to flower the same summer. Ordinary soil.

Alpinum is the same as Cheiranthus alpinus, which see. Linifolium (also grown as Cheiranthus linifolium), 9 ins., mauve, is a hardy biennial. Sow in May.

Erythraea, Centaury (ĕr-ith-rē-a. Ord. Gentianaceæ). The species Massoni (diffusa) is a pretty rock plant with rose flowers in summer, height 6 ins. Muehlenbergi and venusta also have pink flowers. They like sandy loam. Propagation is by seeds sown under glass in spring.

Erythrina, Coral Tree (ĕr-ith-rȳ-na. Ord. Leguminosæ). The most interesting member of this genus is Crista-galli, which bears racemes of scarlet flowers in summer. It is a handsome deciduous shrub. Although not perfectly hardy, it will thrive on an outside wall if the position is sunny and sheltered. The station should be prepared by adding loam, peat, and road grit or manure, and sand. It should be mulched with manure in early summer, and the stools covered with ashes in winter. Propagation is by cuttings, which should be removed with a heel and kept close in bottom heat.

Erythronium, Dog's Tooth Violet (ĕr-ith-rō-nium. Ord. Liliaceæ). Charming bulbs, with quaint flowers, well adapted for cool, shady spots in the rock garden, where they will flower in spring. Dens-canis, the common Dog's Tooth Violet, is mainly lilac, but varies in colour; there are rose and white forms of it. Americanum, yellow spotted with brown; and giganteum, cream with orange patches and marbled leaves, are good species. Johnstoni, rose with yellow zone, marbled leaves, is beautiful but rare. They grow about 6 ins. high. They may all be planted about 6 ins. deep and 9 ins. apart in autumn in any good garden or ordinary soil.

Escallonia (ĕs-ca-lō-nia. Ord. Saxifrageæ). This genus of evergreens includes one very popular plant in macrantha (Ingrami), a beautiful shrub that thrives out of doors in mild districts, and has pink flowers in summer, followed by berries. It is not particular as to soil, and may be propagated by cuttings of firm wood in a frame. There are several varieties, one of the best being sanguinea. Langleyensis, a hybrid with long pink sprays; and Phillipiana, white, are also good. Iveyi, probably a natural hybrid, resembles macrantha, but the flowers, white stained with crimson at the base, come later. The Escallonias are very beautiful in the south-west of England, where in some cases they form hedges.

Eschallot. See Shallot.

Eschscholtzia, Californian Poppy (ĕs-chŏlt-zia. Ord. Papaveraceæ). As stated under Annuals, these are popular hardy plants for sowing outside in spring to flower in summer. Most of the garden varieties, including the popular orange crocea, have sprung from the yellow species californica, which is not much grown nowadays. Seedsmen now offer varieties in a wide range of colours, and a double form of crocea. The choicer varieties, of which seed is scarce, are worth sowing in pans and pricking-off 3 ins. apart into boxes, which can be kept in frames until planting-out time in May, when they may be set out 1 ft. apart in well-worked garden soil.

Espaliers. Correctly speaking, an espalier is a framework for supporting fruit and other trees, but the term is now applied to the tree itself, which is trained with one vertical branch and several tiers of horizontal branches 1 ft. apart growing from it at right angles. They

are suitable for the sides of kitchen-garden walks, and are well adapted for Apples and Pears. See Apples and Fruit.

Eucalyptus (eū-cal-ip-tus. Ord. Myrtaceæ). A large genus of trees. Globulus is the popular Blue Gum, so often grown as a pot plant for standing in halls and porches for disinfecting purposes, but suitable for outdoor culture in mild districts. It thrives in peat and loam. Propagation is by seeds, or cuttings in sandy soil in early summer, under a bell-glass. Gunnii is also an interesting species; and citriodora, which has citron-scented leaves, is sometimes grown.

Eucharidium (ēuchar-ĭd-ium. Ord. Onagrarieæ). Grandiflorum is a pretty rose annual 1 ft. high, and there are a white and other varieties. Sow outside in spring in ordinary garden soil.

Eucharis (ēu-kar-is. Ord. Amaryllideæ). One of the most valuable of warm-house plants, on account of the profusion of its large, substantial, pure white flowers, which are good for wreaths, bouquets, and general cut-flower work. It is easy to grow, and the complete failures sometimes seen arise from the attack of a mite which infests the bulbs, multiplies enormously, and renders the plants weak and dingy. It is impossible for the plants to thrive when this pest is at work, and when its presence is suspected the best course is to shake out the bulbs, wash the soil from them, and soak them for a quarter of an hour in a solution of liver of sulphur (sulphide of potassium), ½ lb. in 6 gallons of water.

Compost. Loam, with a fourth of leafmould and some sand, suits. If potting is required, it should be done after flowering, but frequent shifts are not necessary; with plenty of water while growing, and liquid manure from the time they begin to bloom, they will flower well in 6-in. or 7-in. pots. They should be flowered in a hothouse, and put into a cooler place afterwards. The water-supply may be gradually reduced after blooming in order to rest the plants.

Propagation. By offsets, which may be removed when repotting.

Species. Grandiflora (amazonica) is the most popular species; Moorei and Lowii are forms of it. They are splendid winter bloomers. Candida is sometimes grown; it has white flowers in autumn.

Eucomis (eū-comis. Ord. Liliaceæ). The species punctata, a half-hardy bulb, with green and brown flowers in August, 1 ft. high, is grown as much for its spotted leaves as for its flowers. It will thrive out of doors in mild districts. It may be grown in sandy loam and propagated by offsets.

Eucryphia (eū-crif-ia. Ord. Rosaceæ). The species pinnatifolia is esteemed for its beautiful white flowers, with prominent golden anthers, which are produced in summer. It is an evergreen shrub growing up to 10 ft. high, and may be grown outdoors in mild districts, but in cold, exposed places must have shelter and protection in winter. It likes a compost of peat and loam. Propagation is by cuttings of young shoots under a bell-glass, or by layers. The two species Billardieri and cordifolia are distinctly not hardy, but they are little grown.

Eugenia Ugni. See Myrtus (Myrtle).

Eulalia (ēu-lā-lia. Ord. Gramineæ). Japonica zebrina is one of our most graceful ornamental Grasses, and a strong clump 6 ft. high or more looks well on the lawn. It is not particular as to soil, and may

be increased by division in spring. There are several other varieties of japonica. Miscanthus japonicus is the same as E. japonica.

Euonymus, Spindle Tree (ēu-ŏn-ymus. Ord. Celastrineæ). These are handsome shrubs, some deciduous, others evergreen, grown for their foliage. The evergreens are good for winter effect, and do well in towns, while they are among the best of seaside plants. They will grow in almost any soil. Propagation is by cuttings of firm wood in autumn. Europaeus is a hardy deciduous shrub, with white flowers in May. There is a variegated variety, and a form with deeper-coloured fruit called aldenhamensis. Japonica is evergreen, and has several varieties; latifolius aureus is one of the best. Radicans is also evergreen, and has several varieties. They make neat low hedges. Two modern Japanese deciduous species in planipes and yedoensis are distinguished by beautiful berries and rich leaf-colour in autumn.

Eupatorium (ēu-pa-tōr-ium. Ord. Compositæ). Some of the Eupatoriums are hardy, and will thrive in ordinary well-drained soil, with spring division. Others require pot culture under glass, and like a compost of loam, a third of leafmould, and sand. These should be raised from cuttings and pinched to make them bushy. They should be cut back after flowering.

Hardy Herbaceous Species

ageratoides, white, August, 4 ft. (syn. Fraseri).
altissimum, blush, late summer, 4 ft.
purpureum, purple, August, 4 ft., and double form.

Greenhouse Species

grandiflorum, white, spring, 3 ft.
riparium, white, spring, 3 ft.
Weimannianum (odoratum), white, autumn and winter, 4 ft.

Euphorbia, Spurge (ēu-phōr-bia. Ord. Euphorbiaceæ). A large and varied genus, including annuals and perennials, hardy and tender, herbaceous and shrubby, all with milky juice. Two or three are grown for the greenhouse, notably fulgens (jacquinaeflora), a brilliant evergreen, growing about 3 ft. high, with scarlet flowers in autumn and winter. It thrives in loam in a hothouse, and is propagated by cuttings. Lathyris is the Caper Spurge, and is hardy. Corollata is a distinct and rare North American hardy species with white bracts, height 18 ins. Cyparissias, yellow, 1 ft., hardy; and Wulfeni, evergreen, greenish purple, 4 ft., are also grown.

Eurya (eū-ria. Ord. Ternstrōmiaceæ). Latifolia variegata is the best of this genus, and is grown for its handsome foliage. It is an evergreen, requiring greenhouse protection. Peat and loam in equal parts suit, with sand. Propagation is by cuttings of mature wood in peaty soil under a bell-glass.

Eurybia. The species Gunniana is the same as Olearia stellulata, which see.

Eutoca (eū-tō-ca. Ord. Hydrophyllaceæ). The species viscida of seedsmen (Phacelia viscida of botanists) has blue flowers in summer, and grows about 18 ins. high. It is easily grown as a hardy annual, thriving in ordinary soil if sown outside in spring.

Evening Primrose (Oenothera. Ord. Onagrarieæ). The Evening Primroses comprise both hardy annuals and perennials. For particulars of species and cultivation see Oenothera.

Evergreen Oak. See Quercus Ilex.

Evergreens. A general term to indicate plants which hold their leaves throughout the year. Perhaps a particular application to foliage shrubs is commonly understood by the term; there are, however, certain evergreen trees, and there are also small evergreen plants grown more for their flowers than their foliage on rockeries. Accepting shrubs as the principal group, we give under Shrubs (which see) selections of evergreen as well as of deciduous species; moreover, all the principal evergreens are treated under their own names throughout the book. Evergreen hedges, as of Yew, Box, Holly, Laurel, Privet, Berberis, etc., enjoy much favour, partly because of their appearance, partly because of the shelter which they provide (see Hedges). In pruning the larger-leaved Evergreens, a knife should be used in preference to shears, in order to avoid cutting the leaves. The cuts should be made near the leaves below, so that bare stumps do not show.

Evergreen Thorn. See Crataegus Pyracantha.

Everlasting Pea (Lathyrus. Ord. Leguminosæ). Beautiful hardy perennial ramblers, suitable for growing against fences and pillars. The typical species is latifolius, now called by botanists sylvestris platyphyllus, which has carmine flowers. There is a splendid white variety called White Pearl, which comes true from seed. They enjoy moist, substantial soil.

Everlastings. The principal "everlasting flowers," such as Helichrysums, Acrocliniums, and Rhodanthes, are dealt with under their own names in this work. To obtain a supply of flowers of good appearance throughout the winter it is desirable to gather them before they are fully expanded, and to hang them in bunches head downwards for a few weeks, but the place must not be close and damp or they will become dull.

Exacum (ĕx-a-cum. Ord. Gentianæ). Beautiful plants for a warm greenhouse, flowering in winter. They like compost of loam, with a quarter each of peat and leafmould, and sand. The annuals are raised from seed in a warm house or frame in spring; and the perennials from cuttings with bottom heat. Affine, a perennial, has violet flowers, and grows 9 ins. high. Zeylanicum macranthum, violet, autumn, 18 ins., an annual, is also grown.

Exochorda, Pearl Bush (ĕxo-kor-da. Ord. Rosaceæ). The species grandiflora is a beautiful white-flowered shrub, blooming in May and growing up to 6 ft. high. It is not particular as to soil, but likes a sheltered place. Propagation is by layers in autumn or suckers in spring. Alberti, a more modern Persian species, growing up to 10 ft. high, also has white flowers. Giraldii Wilsonii, large white flowers in spring, is another interesting modern species.

Eyebright (Euphrasia). A parasitic plant forming nodules on the roots of the host plant without injury to it.

F

Faba (fā-ba. Ord. Leguminosæ). The species vulgaris is the ordinary Broad Bean of our kitchen gardens. See Bean.

Fabiana (făb-ĭ-ā-na. Ord. Solanaceæ). Only one species is grown, namely, imbricata, an evergreen Heath-like shrub from Chili, growing up to 6 ft. high, with white funnel-shaped flowers in May. It enjoys the peaty soil beloved of Heaths, but is not perfectly hardy. Propagation is by cuttings of ripe young shoots under a bell-glass or in a frame in spring, kept close.

Fagus, Beech (fā-gus. Ord. Cupuliferæ). The common Beech is F. sylvatica, and there are many varieties of it, such as dark purple, variegated, copper, and pendulous. See Beech. Of modern Chinese species, Engleriana is remarkable for its pale green glaucous leaves.

Fair Maids of France. See Ranunculus aconitifolius flore pleno.

Fairy Rings. Circles of fungi are sometimes seen growing in the grass, and every year they get stronger, owing to the rich nitrogenous deposit following the decay of the earlier members. A " fairy ring " in a meadow is interesting and pleasing, but it is out of place in a garden, and may be destroyed by syringing with a pound of sulphate of iron dissolved in 3 gallons of water.

Fallowing. To " fallow " ground is to dig or plough it and leave it without a crop for a period, in order that the corruptible matter within it may decompose and the ground be aerated. Good gardeners rarely adopt this practice. By proper tillage and manuring they make the ground capable of carrying continuous crops.

False Acacia. See Robinia Pseudacacia.

Farfugium. See Senecio.

Farmyard Manure. See Manures.

Fasciation. A term descriptive of stems which become flattened, and produce unusual quantities of leaves and flowers.

Fascicle. A cyme (see Cyme) in which the flower-stems are of corresponding length, as in Sweet William.

Fastigiate. Narrow and tapering in habit, as in Lombardy Poplar and many other trees.

Fatsia (făt-sia. Ord. Araliaceæ). The one plant of importance in this genus is japonica, which is almost universally grown under the name of Aralia Sieboldii, a half-hardy shrub much esteemed as a room plant, thriving in sandy loam, and propagated by cuttings. It will thrive out of doors in sheltered places.

Feather Grass, Stipa pennata. See under Annuals: Ornamental Grasses.

Feather Hyacinth. See Muscari comosum.

Fences. In enclosing ground to form a garden the nature of the dividing line must be carefully considered. A brick or stone wall is best, because it gives immediate privacy, security from cattle, and shelter, besides affording support for greenhouses, fruit houses, and trees. It is, however, the most expensive. The cost varies, and estimates

should be got from local builders. Wooden fences are more general, and the most popular is Chestnut spile fencing, costing with 8 dipped 4-ft. spiles to the yard, and posts, about 2s. 6d. per yard run. If cattle have to be considered there should be a length of barbed wire above the top. An oak fence 6 ft. high may cost 8s. per yard run. Galvanised-wire fences are popular, and a fence 4 ft. high will keep back stock. The wires should be 1 ft. apart, and the lower half protected with wire netting, to exclude lambs and rabbits. The top wire at least should be barbed to discourage cattle from putting their heads over; but if there is anything tempting on the other side they will try to get their heads between the lower wires. The posts for a wire fence should be of oak, the lower part tarred for the sake of lengthening their life. Neither a Chestnut spile nor wire fence is adequate as plant-shelter, and if that is a consideration a hedge should be planted as a supplement. See Hedges.

Fendlera (fend-lē-ra. Ord. Saxifrageæ). The species rupicola is a shrub growing 4 to 6 ft. high, especially in a sheltered position on a wall and in good loamy soil. White flowers. Propagation is by cuttings, inserted in sandy soil in summer and covered with a bell-glass or hand light.

Fennel. A kitchen-garden herb used principally for flavouring sauces, but also to some extent for garnishing. Buy roots and plant 1 ft. apart, or sow seed in autumn or spring. The flower-stalks of a perennial clump should be cut down early, or the plants will not last long.

Fennel Flower. See Love-in-a-mist (Nigella damascena).

Fenzlia dianthiflora (fēns-li-a. Ord. Polemoniaceæ). This pretty Californian annual, with purplish flowers in July, height about 4 ins., is the same as Gilia dianthoides. It can be grown from seed sown outside in April, or may be sown in autumn. Being so low a grower it makes a nice carpeting plant. Light loamy soil is most suitable.

FERNS: SELECTION AND CULTIVATION

Almost every lover of plants grows a few ferns, and a considerable number specialise them. The latter class have their own publications. The ordinary species have no particular interest for them. On the other hand, the general amateur could not possibly grow all the varieties, as in the case of some species they number hundreds, but must content himself with a selection of the best kinds. Most of the principal ferns are mentioned under their own names in this work, but a few general observations may obviate repetition with respect to certain cultural points.

Propagation. The majority of ferns do not flower, and the " seeds " must be looked for in the form of spores on the under surface of the fronds, to which they adhere until they ripen. In sowing, a fine surface of soil is prepared, and the fronds are either laid on when the spores are mature, or held over the pot and rubbed with the fingers to scatter the spores. The pots should be shaded. A plate-like process, the prothallium, on which the male and female organs develop, forms, and from these the plants arise. They may be pricked off, potted singly, and repotted as required, the same as ordinary plants. Some kinds of ferns which form a spreading root-

stock, the Maidenhair for example, may be propagated by division; the plants may be cut up when growth starts in spring. Some ferns form plantlets on the fronds; the latter can be drawn down to the surface of the soil in another pot, and there fixed in position till the plantlets have rooted freely, when they may be severed.

Soil. Fern growers no longer pot their plants almost entirely in peat; it is recognised that loam contains more nutriment, and consequently it is used much more largely for ferns than was formerly the case. Half each of fibrous loam and peat, with a quarter of leafmould or decayed manure, a heavy dash of sand to ensure porosity, and a few bits of charcoal over the drainage, will suit the majority of ferns admirably.

Shade. Another old idea has been modified. Speaking generally, ferns are certainly shade lovers; but it is found that hardy kinds may be grown in sunny parts of the garden if they have adequate root-moisture. Under glass they are liable to suffer from the aridity of an unshaded house unless the grower is at hand to ply his syringe in the hottest part of the day.

Repotting. It is wise to turn ferns out of their pots every spring, if only to rearrange the drainage, but one may go farther, as a rule, and remove the old soil from the side and base of the ball without disentangling the roots, afterwards replacing in the pot and ramming in fresh soil.

Ferns in Rooms. As a rule ferns soon fail in rooms, because the air is too dry; but with care and judgment they may be kept healthy a long time. The principal point is watering. If the soil is dry for some time the plants are sure to suffer; on the other hand, a sodden state is bad. The only way of keeping things right is to test the pots every day in summer (see Watering) and be guided by the sound. In winter, water may not be wanted more than once a week, Another important matter is to ensure ventilation without cold draughts. An open window and a closed door generally permit of the happy medium being struck; with both open together the plants may be injured.

Ferns in Baskets. Some ferns (see selection below) look their best in baskets. Wire receptacles may be used. They should be lined with moss to keep the soil in, and a compost similar to that for pots used. In summer the baskets may be dipped daily in a tub of water.

Indoor Ferneries. In large places it may be possible to devote a house to ferns, and if so it should be done thoroughly, covering the walls, providing rocks and water, and shading the roof. A simple way of covering the walls is to fix wire frames a few inches from the wall, pack with compost, and plant. The ferns should not be grown in pots, but planted among blocks of tufa.

Outdoor Ferneries. A fernery is a good adjunct to a rock garden, and stones should be used in preference to tree roots, which rot quickly. The situation should not be heavily shaded. Christmas Roses and various hardy bulbs may be planted between the ferns to flower in winter and spring.

Filmy Ferns. The Todeas, Hymenophyllums, and Trichomanes should be kept separate in a case or cave where the shade is dense and the atmosphere saturated.

Fern Phrases. Ferns are cryptogams (which see). The creeping stems of some species are called rhizomes. The leaves are called fronds, and the stalks stipes. The first divisions of divided forms are called pinnae, and the subdivisions pinnules. The seeds are called spores, and the case covering the latter is the indusium. The clusters of sporangia are called sori. The female organs are called archegonia, and the male antheridia. Both form on the membranous plate (prothallium), which is the first growth from the spore.

Good Room Ferns	*Good Basket Ferns*
Adiantum cuneatum (Maidenhair)	Adiantum Edgeworthii
Asplenium bulbiferum	Asplenium flaccidum
Nephrodium molle	Davallia Mooreana
Pteris cretica cristata	Gymnogramme schizophylla
,, serrulata	Microlepia (Davallia) hirta cristata
,, tremula	Nephrolepis davallioides furcans

Ferraria. With botanists, this is the correct name of the plant popularly known as Tigridia, which see.

Fertilisation. See Hybridisation.

Fertilisers. See Manures.

Fescues. Grasses of much value for mixtures wherewith to sow lawns, tennis-courts, etc., but of no particular value as ornamental plants. See Grass and Lawns.

Feverfew. The members of the Pyrethrum section of Chrysanthemums are called Feverfews, and the name is sometimes applied to Chrysanthemum Parthenium aureum. See Golden Feather.

Ficus, Fig (fi-cus. Ord., Urticaceæ). This genus includes such widely different plants as the Indiarubber plant (elastica) of our gardens and the delicious Fig (see next item). The Indiarubber plant is popular for rooms, and may be kept healthy in a compost of peat and loam in equal parts, with sand, if carefully watered (see Watering), ventilated without cold draughts, and the leaves sponged weekly in summer. It may be propagated by pieces of stem with a leaf attached in a propagating case. Pumila (repens, stipulata) is a graceful, green-leaved creeper suitable for a greenhouse wall.

Fig (Ficus Carica). The Fig is a very old and esteemed fruit, but it is not cultivated in the majority of small gardens. There are two things against it: its rampant habit and its want of complete hardiness. It is sometimes given a snug corner in the angle of two walls, and then, with a little shaping to keep it within bounds, it justifies its existence; but if neglected it is apt to straggle badly and become rather a nuisance. In such a case root-pruning will do good. A firm soil with plenty of lime is desirable. The trees may be planted in autumn or spring.

Propagation. If increase is wanted it may be effected by cuttings of mature wood each containing a couple of buds, which may be inserted in sandy soil in winter and plunged in a mild hotbed or stood in a warm house. Figs are sometimes grown in pots in large establishments, and the best varieties yield delicious fruit. They give two and even three crops in a year.

Pruning. This must be done guardedly, or potential fruiting

wood may be cut away. If the pruning is restricted to thinning crowded bushes, and is mainly concentrated on removing shoots from which fruit has been gathered, the grower does not go far wrong.

Varieties. Brown Turkey is about the best variety for outdoors. It is also good for pots, and so is Negro Largo. Where a feature is made of Figs, St. John's may be added for its earliness, and Grizzly Bourjasotte for its fine flavour.

Fig Marigold. See Mesembryanthemum.

Filbert. See Nuts.

Fingers-and-toes. The same as the fungus disease of Greens often called Ambury. See Ambury, also Broccoli for remedies.

Fir. The general name "fir" is applied to a considerable number of resinous, cone-bearing trees. Thus Pseudotsuga (or Abies) Douglasii is often called the Douglas Fir, Abies pectinata the Silver Fir, and Pinus sylvestris the Scotch Fir. Particulars of the different kinds are given under their own names.

Fitzroya (fitz-rōy-a. Ord. Coniferæ). The species patagonica, a hardy evergreen conifer, is worthy of mention, although not of primary importance in its class. It thrives in any good garden soil.

Flag. See Iris.

Flame Flower. See Kniphofia.

Flame Nasturtium. See Tropaeolum speciosum.

Flax. See Linum.

Flax, New Zealand. See Phormium.

Fleabane. See Erigeron.

Florets. The individual items in a capitulum or head of flowers, as in Chrysanthemums.

Florists' Flowers. A term applied to certain plants specialised by trade florists and amateur exhibitors. The principal kinds are as follows:

Antirrhinums	Dahlias	Pinks
Auriculas	Gladioli	Polyanthuses
Begonias	Hyacinths	Primulas
Carnations	Irises	Roses
Chrysanthemums	Narcissi	Sweet Peas
Cinerarias	Paeonies	Tulips
Daffodils	Pansies	Violas

All the above are dealt with under their own names in this work. Such old-time florists' flowers as Fuchsias, Hollyhocks, Pelargoniums, Petunias, Ranunculuses, and Verbenas can hardly be included in these days, although they are still grown.

FLOWER GARDENS: FORMATION AND MANAGEMENT

A well-arranged, well-managed flower garden is a source of immense pleasure and enjoyment. It is beneficial physically and spiritually. The cultivation of beautiful flowers is at once a pleasant pastime and an ennobling pursuit. In years gone by very narrow ideas of flower gardening were displayed: the plants grown were of a few kinds, tender in constitution and garish in bloom. Nowadays much greater breadth and freedom prevail. Hardy plants of many kinds are used, and the garden is more varied and more interesting. With abundance of flowers all round the house, a cool stretch of grass, belts of shrubs, a rockery, water, and a judicious admixture

of trees, the home surroundings are made beautiful and fragrant. The principal features of the flower garden may be taken seriatim.

Herbaceous Borders. See remarks and selections under Herbaceous Plants.

Bedding-out. In these days " bedding-out " does not mean quite the same as it did in years gone by. A much greater variety of plants is used, and more consideration is given to the provision of beautiful combinations. Once upon a time " bedding-out " consisted in little more than putting out so many thousands of Zonal Geraniums. These plants were as much prized for their foliage as their flowers, and a new variety with richly-coloured leaves was very valuable. They were by no means without beauty, and the bright old Geranium has much to recommend it, but it must not be used to the exclusion of everything else. A group of flower-beds on a lawn is still a feature of many large gardens; and it may be made attractive most of the year by arranging two plantings, one in autumn, the other in spring. At the former, bulbs and Wallflowers may be used largely, but as with the former alone the ground would be bare until growth began at the end of winter, and bare earth is not liked in these days, Arabises, Aubrietias, Forget-me-nots, mossy Saxifrages, and other dwarf carpeting plants are used with them (see Beds and Bedding-out). The three first-named are easily raised from seed outdoors in early summer; the last may be propagated by division. Daffodils, or Daffodils and Hyacinths in mixture, may be used in some of the beds; but Tulips give a richer glow of colour, and these noble flowers enjoy high favour. The early Dutch varieties bloom with the other bulbs, and are of low stature; the Cottage and Darwin Tulips flower in May, and are tall growers with immense flowers. They are in full bloom with the Wallflowers, and may be cleared out of the beds at the end of May together; the Tulips to be " laid in " somewhere in the reserve plot, the Wallflowers to go on the rubbish heap. Another plan for part of the spring bedding is to raise a stock of coloured Primroses, Auriculas, Polyanthuses, and Oxlips from seed in summer, and plant them out 1 ft. apart in beds in autumn. They are at their best with the Wallflowers and May Tulips, and may be planted out with the latter in the reserve garden. When the spring flowers are over, the turn of the summer and autumn flowers comes. A good stock of these should be prepared beforehand: Geraniums from cuttings struck the previous autumn and wintered in boxes in a cool house; Calceolarias, Pansies, Violas, and Pentstemons from cuttings struck in autumn; Verbenas, Snapdragons, Pentstemons, and Indian Pinks from seed sown in a warm house in January, and hardened in a cool house or frame; China Asters, Mimuluses, Ten-week Stocks, Phlox Drummondii, Marigolds, Salpiglossis, and Nicotianas (Tobacco) from seed sown under glass in March; tuberous Begonias from tubers started in boxes in a greenhouse or frame in March; Sweet Peas from seed sown in pots or boxes in early spring; and Carnations raised from layers in summer. With a nice variety of plants such as this, much more beautiful and diversified beds can be made than with the old combination of Geranium, Calceolaria, and Lobelia alone. There is room for the display of much taste and

originality in bedding with this class of material, and it is free from the objections urged against the old style of bedding-out. At each change the beds should be well dug and manured, but in preference to using a heavy dressing of dung apply a light coat, and supplement it with superphosphate or bone flour at the rate of 3 oz. per square yard.

Carpet Bedding. This is the most formal of all systems, because the plants used are low growers with coloured leaves, arranged in bands and panels, and restricted by regular cropping with finger and thumb throughout the summer. It enjoys no favour, and may be considered obsolete, although used occasionally in the public parks to stimulate the curiosity of the cruder elements of the community.

The Scented Garden. This may be a charming section. Here can be brought together Lavender, Southernwood, Bergamot (Monarda, highly perfumed when the hand is drawn across the leaves), Sweet Peas, Clove Carnations, Night-scented Stock, Wallflowers, Tenweek Stocks, Sweet Rocket, Sweet Scabious, Daphne, Lily of the Valley, Heliotrope, Jasmine, Mignonette, Sweet Sultans, Roses, Mock Orange (Philadelphus), Winter Heliotrope (Tussilago), and many other sweet flowers.

Garden-Houses. Garden-houses, like dwelling-houses, will differ in accordance with the means, requirements, and tastes of those who build them. If the garden-house is no more than an arbour, it will still become dear to us through the fragrance and sunshine of many a long summer day. It shall be " rustic " in material and construction, and it shall be placed in a position where it not only gets abundant sunshine, but also commands a beautiful view, whether of externals in the shape of hill and forest, or of internals in the form of border and lawn. It may be in the angles of two walks where paths intersect, or it may be at the end of a favourite walk. It will be creeper-covered and it will be adequately seated, so that it may really serve the purposes of a room. The ingenious specialist-builder of summer-houses now provides a house which is built on a pivoting base, so that we can at will swing it from one aspect to another in order to get more or less sun and wind. This creates a creeper difficulty, but it can be got over by providing the plants with a separate supporting framework. Or smaller plants can be grown in baskets or pots fitted in wire cages for attachment to the structure, so that they move with it. By one means or another flowers will certainly be provided.

The garden-house may, however, be something more than a rustic arbour. It may be a substantial structure framed in stout unbarked timber, thatched, and fitted with casement windows; the front will be open. It will be a building with some pretensions to architecture. With a background of trees there will be a welcome suggestion of coolness and shade. If it is on sloping ground, a stone stairway with surrounding rockwork will give opportunities for establishing pretty alpines. If on the level, some beautiful and striking object, such as a special shrub, a pool with or without fountain, or a bed, should be placed near. It is only in large places, perhaps, that there is a case for a solidly built stone loggia, stoutly pillared and roofed. But where such an erection is made the surroundings will be in keeping—tiled path, stone steps, creepers on the walls.

There may be economy in house-building if a roomy garden-house is made. True it will not be suitable for use at certain periods, but

it is mainly in hot weather that a small dwelling-house is at a disadvantage, and it is precisely in such weather that the garden-house is most suitable. In cold wintry weather the small dwelling is snug and comfortable where, in summer, it may be oppressive. A small dwelling-house and a spacious arbour—such is the combination which makes for the maximum of benefit and enjoyment with the minimum of expense. Think of it, men of fixed incomes who feel so severely the pressure of heavy taxation, for it may be the solution of your many difficulties and the solvent for your anxieties.

Pergolas. There is a certain connection between the garden-house and the pergola, because the class of material which suits the one may also suit the other, and, by presenting the opportunity for buying in quantity, secure lower rates. Thus, the " rustic " timber which the local builder or carpenter gets from the woods may serve both for arbour and pergola. We see pergolas constructed entirely of such timber, the stouter portions being used for the uprights and the lighter for the top pieces. And these uprights, set perhaps 10 ft. apart both longitudinally and laterally, will be connected in each direction, or possibly with the longitudinal pieces straight and the lateral pieces crossed diagonally. Those who like frequent openings will probably give each pair of poles in the lines a small bed, turfing the alternate spaces; those who do not will make a continuous border from end to end. The pergola may span a grass or gravel walk, or no walk at all. Or broken flagstones may be laid irregularly, with or without small plants between. Or yet again it may be paved closely with whole flags, so that it may provide comfortable walking in wet weather. The one thing that it should not do is to span the path which is the only approach to the front door of many houses, because it will be tiresome in wet, windy weather, and also in the dark.

The climbing plants will comprise Roses, Clematises, Jasmines, Honeysuckles, special Vines and Ivies, and such other plants as Eccremocarpus scaber, Cobaea scandens, Akebia quinata, and Canary Creeper.

If the pergola has stone pillars the task of clothing them will be somewhat more exacting than if the supports are of timber. And although stone pillars are the most lasting, well-matured timber the base of which is charred or pickled will last many years.

Arches. Creeper-clad arches afford a ready and inexpensive means of breaking up garden stiffness, and should be introduced wherever there is a legitimate place, such as the junction of paths, divisions between departments of the gardens, ends of lawns, and so on. Those to whom the metal arches of the ironmonger are a convenience need not hesitate to use them, but arches of rustic wood are more suitable. Both kinds can be bought ready made at prices ranging from a few shillings upwards. But the country gardener will perhaps make his own. He may be advised to display liberality in the size and treatment of his principal uprights, not only selecting stout pieces, but dressing the lower part with tar or creosote, and embedding them the better part of 3 ft. deep. Most of the plants mentioned under Pergolas may be used for clothing arches.

Shade and Wilderness. In the burning sunshine of summer it is

ill to have no shady spot in which to seek rest and refreshment, alike of body and spirit. The garden in which one has to make the best of the meagre shade of a Rose arch has to be fled when the heat of an unclouded July day has set its fierce hand upon the countryside. For many golden hours of summer it becomes uninhabitable, and that at the period when it is wanted most. How often the first spell of hot summer weather reveals a weakness in a new garden which, with its borders and lawns and arches, seemed so full of complete and perfect promise in the spring! There are moments when the disillusioned maker feels that he would sacrifice the whole of it in exchange for a simple woodland glade, where there is nothing but leaf and bird-song.

Let us then plant for shade. There are sites where trees are called for. We can often so place trees that they will present a " garden " side and a " wilderness " side. Or we might put it that they give a front and back—a front for lawn and cool seat at resting and reading time; a back for winding shady walks, with shrubs and undergrowth and naturalised plants. It is right and well to think of both when making gardens. The shade-garden can be carpeted with Ivy, Periwinkle, Anemone, and Lily of the Valley, the wilderness can be made to smile with Spiraeas, Foxgloves, Epimediums, Plantain Lilies, Snakesheads, Violets, Lilies, Hellebores, Hypericums, Daffodils, Primroses, Wood Hyacinths, Solomon's Seal, Wood Lilies, Veronicas, and many other beautiful plants. And this portion of the garden need not be meticulously dressed and weeded and watered and pruned. In its earliest years there will have to be a certain amount of observation and authority, if only to keep in subjection such strong coarse weeds as might prevent the selected plants from establishing themselves; but once these have formed their colonies and are capable of looking after themselves, there will be little call for labour. On the contrary, the woodland and the wilderness will be places of repose and rest.

It is not in large places only that wilderness may be formed. There is an aspect of it which should appeal to owners of small gardens, which are so often merely glare, with every outline marked like a hedged field. It is that shade and wilderness rob the garden of its stiffness, disguise its rawness, and have at least the appearance of extending its space. And this is more than pretence in the sense of providing greater length of path and larger variety of feature. Garden space should not be measured in " feet super," but in the visions which meet and engage the eye. Judged from this standpoint, wilderness is supreme. Because it cannot be measured, it gives the impression of boundlessness. Because it can only be seen in parts, it appears to be a greater whole. It is part of the woodland, which means that it is nearer nature than the most cunningly contrived garden.

The flowers of the wilderness have but to get established to appear regularly in their seasons. When Meadowsweet and wild Parsley and Foxglove and Hypericum are in full riot, it seems hopeless to expect that the lowly Violet, Lily of the Valley, and Anemone can maintain existence, but with spring they appear again. All these little plants like to get into colonies, indeed, odd plants put in here and there instead of in a group together have but a poor chance of

life. If the nucleus of a colony can be planted in autumn, when the coarser plants are down for the winter, it will have several months in which to bed itself in, and start the course of self-propagation that ever afterwards will keep it secure, even when overgrown in summer. Seeds of the bigger things, such as Foxgloves, may be flung broadcast in early summer, to spring and grow without further care from the gardener. Those which find a congenial resting-place will germinate and grow in their own good time. Thereafter the gardener will learn to look out for the Violets in this corner, the Solomon's Seal in that, the clumps of Honesty here, the scarlet seed-heads of the Gladwin yonder. Successive generations of Foxgloves will flower and seed and die. Plants not suited to the place will make feeble attempts to grow and then fail, disappear, and be forgotten. In the remote depths the paths will be scarcely wider than rabbit-runs, and like them they will wind and cross and double, turning particularly at groups or belts of shrubs, as of Berberis Aquifolium, Aucubas, Dogwood, Tutsan, Butcher's Broom, and Rhododendron; indeed the best point for a path to double is that at which its continuation is obscured by some high, dense object, such as a group of evergreens.

The exposed herbaceous border has its shade, which is, however, different from the shade of woodland and coppice. It is not and cannot be dense, because there are no large trees and thick masses of undergrowth. Such trees as there are consist of small standards like Thorns, Laburnums, and perhaps Apples. The shrubs are probably flowering kinds, grown thinly and pruned for the sake of getting bountiful blossom. But limited though the amount of shade is, it helps many beautiful plants which are sensitive to unbroken sunheat, as Hepaticas and some other Anemones, including angulosa, Woodruff (Asperula), Asphodel, the Astilbes and Spiraeas, Astrantia major, the hardy Cyclamens, the Cardamines, including the Lady-Smock, the lovely Dielytra (Dicentra) spectabilis, which should have shelter from cold wind as well as some shade, the American Cowslips, the graceful Epimediums, the Meadow Geranium (pratense), Winter Aconites, Geums, Hellebores, many Liliums, the glorious Poppywort Meconopsis Wallichii, Mimuluses, Omphalodes verna, Primroses, the Bloodroot (Sanguinaria canadensis), numerous Saxifrages, the Foam Flower (Tiarella cordifolia), and many other good plants. So simple a provision as a site on the north side of a Rose pillar makes a great difference to these susceptible things; they grow vigorously, when without shade they would be weak and poorly flowered. Happily, they are nearly all inexpensive, and can therefore be planted in quantity.

Walks. There is a strong case in most gardens, and strongest of all in small gardens, for giving particular attention to the embellishment of the neighbourhood of walks, which of all parts of the garden are the most frequented, yet often the most neglected. To consider the principal beauty of a garden in connection with its walks is to strike a firm, attractive note at the very entrance to the place, to maintain it up to the doors of the house, and to extend it to every section. It is, however, common to see the sides of walks left bare. Where, at the gates of suburban, and indeed many rural, gardens also, are found groups of heavy, dull, and monotonous

evergreens, there should be the first of a series of beds, or the beginning of a continuous mixed border, in which pillar Roses, flowering shrubs, and annual and perennial herbaceous plants, are tastefully grouped; so that interest is awakened and beauty seen from the moment foot is set on the place.

The adornment of walks will vary with their character and the part of the garden which they serve. What may be termed the entrance-walk will probably be of gravel; it will be drained, made substantially with under rubble, and cambered in order to carry rain to the sides. Leading up to the front door, it will not pursue a series of zigzags, nor double upon itself, although it may follow an even and graceful curve which lengthens it a little. The subordinate walks may be of ash or even turf. In the shrubbery, the woodland, and the wild garden, they will certainly be either of grass or heath. And such organic differences of character call for differences of treatment. The entrance-walk should have no covering. Even an arch is apt to be a nuisance. Pretty enough on a summer morning, it is an ugly obstacle to pass on a dark, wet, winter night, when clothing, umbrella, and temper are alike apt to become lacerated. The material for embellishing such paths should be at the sides only, not over them. If disconnected beds are preferred to a border, let them be interspersed with objects of interest which rise above the level of the ordinary bedding plants, such as a group of pillar Roses, a clump of Pampas Grass, a Bamboo, a conifer, a standard flowering tree, or a clump of Sweet Peas; and these objects will generally look best if given a small circular bed, which may at discretion be carpeted with Violas or other low-growing plants.

If the space available beside the walk is severely restricted, it may be necessary to abandon the idea both of large-plant borders and disconnected beds, but still something should be done. Rock edgings have strong claims, and there is no reason why, if a supply of small stones can be obtained, such edgings, ranging from 18 ins. to 3 ft. in width (for strict uniformity is undesirable), should not be made in thousands of small gardens. In a sense they are miniature rock gardens, with only one or two tiers of stones. Numerous small Alpines and bulbs could be drawn upon to furnish them. It only needs a little management, therefore, to provide the sides of the principal gravel walks with objects of beauty and interest which every visitor will enjoy and appreciate. And the inner grass walks, whether mown paths on the lawn proper or uncultivated paths leading to the wilderness, can as easily be given attractions. A combination of pergola and herbaceous border is perhaps the best for the shaven path. See Pergolas. The undressed path probably winds between shrubs and beneath trees, where a great many beautiful plants can be grown, as is shown under Shade and Wilderness above. The path leading to water probably descends, and a case is presented for treatment with flat stones, beside and between which Saxifrages, Primulas rosea, japonica, and other moisture-loving species, Portulacas (for hot sites), and, at the lower parts, aquatics or semi-aquatics, such as Japanese Irises, Arrowheads, Lady-Smocks, and Nymphaeas, may be established.

There should be no kind of path in the garden which is not studied from the point of view that it is the paths of the garden which come

most under the eye, one at this season, another at that, and consequently that one of the first objects, after finding appropriate places for them, is to provide something suitable for their adornment. For remarks on the making and care of walks see Walks.

Steps. Steps are naturally associated with paths, although there are cases in which they lead directly to open lawns. It is particularly in gardens on sloping ground, whether terraced or otherwise, that we find steps; in the flat garden there are few. Steps are of various kinds, from the elaborate flight of fine stone, broad and massive, with carven pillars and handsome balustrades, in the most important parts of large gardens, to the rough steps hewn in sloping ground and laid with stones or logs. In any and every case suitable ornamental plants can be found for them. Perhaps in the more elaborate flights the steps themselves will not be planted, the gardener contenting himself with filling the vases with Ivy-leaved or Zonal Geraniums and setting tubs of Agapanthuses, Hydrangeas, or Agaves at the bottom. But in the case of less elaborate flights, plants will certainly be established between the steps, whether or no vases and tubs are used also. Arabises, Alyssums, Aubrietias, Alpine and hybrid garden Pinks, Portulacas, Sun Roses, Cerastiums, and Saxifrages will provide abundance of material. Flights of steps thus treated add greatly to the charm of the garden, and in the case of flights connecting gravel walks, they make a pleasant break in the lines of herbaceous borders or lawn beds. In the case of a flight of steps leading to turf, a flower bed may be provided near the bottom, and while not so close as to impede free movement, yet near enough to be under close scrutiny, for people do not, as a rule, come down garden steps as children come down house stairs, that is, either three steps at a time or in a slide down the banisters; but move sedately and contemplatively, with an eye turned to beauty. In many cases steps will practically form part of a rock garden, merging at the sides of the flight into the stones of the rockery. Such arrangements are beautiful near garden-houses and in approaches to the waterside.

Walls. Walls are as permanent as the principal walks, and as conspicuous. Wall of house and wall of outbuilding, as well as terrace walls—all come boldly under the eye and all must therefore be furnished, in part perhaps with varieties of Ivy and Virginian Creeper, but also in part with beautiful flowering and berried shrubs, such as Ceanothuses, Buddleias, Clematises, Escallonias, Pyrus (Cydonia) japonica, Cotoneasters, Crataeguses (Thorns, particularly Pyracantha or Lalandi), Jasmines, Honeysuckles, Magnolias (grandiflora, that fine evergreen, brooks no companion in its vigour), Calycanthus praecox (Chimonanthus fragrans, deliciously perfumed), Kerrias, Roses, and Wistarias.

Rougher walls, open-jointed or mortar-crumbled, double walls loosely built, and walls which sustain banks, may be set with things that require little moisture and enjoy lime, such as Wallflowers, Campanulas of the smaller species, Arabises, Aubrietias, Alyssum saxatile, Alpine Pinks, such as Dianthus deltoides, encrusted Saxifrages, Sun Roses, and Sedums. Happy he who, in a moist district or in a sheltered damp spot, can grow on one of his walls the beautiful Tropaeolum speciosum—an object, when at home, of almost unequalled beauty.

Rockeries. Some form of rockery is an essential feature of the modern flower garden, and in view of its importance special attention has been given to the subject. See remarks and selections under Alpine Gardens and Plants, and under Rockery.

Trees. See remarks under Trees.

Shrubs. See remarks under Shrubs.

The Water Garden. The water garden can often be associated with the rock garden. Reference has been made to the desirability of providing different aspects, and forming cool bays. If water can be carried to one or more of these bays, and peaty soil is provided, a number of beautiful moisture-loving plants can be grown, such as Japanese Irises (Iris laevigata or Kaempferi varieties), Marsh Marigold (Caltha palustris), Water Violet (Hottonia palustris), Wood Lily (Trillium grandiflorum), Primula japonica and P. rosea, the Water Flag (Iris Pseudacorus), the Water Soldier (Stratiotes aloides), the Flowering Rush (Butomus umbellatus), the Bog Bean (Menyanthes trifoliata), the Lady-Smock (Cardamine pratensis), the Lady's Slippers (Cypripedium Calceolus and C. spectabile), the Arrowhead (Sagittaria sagittifolia), the Winter Hawthorn (Aponogeton distachyon), and the reeds Carex riparia variegata and Typha latifolia. A pool, puddled with clay or lined with cement, may be made for Water Lilies. If the plants are sunk in 2 to 3 ft. of water in April, with the roots packed in loam in pieces of old sacking, or bound round with moss, they will thrive. When the water is covered with flat brown, green, and purple leaves, and white, rose, yellow, and blue flowers, the pool will be a charming sight. See also Water and the Sunk Garden.

Grass. Well-kept grass is an important feature of the flower garden. See remarks under Grass and Lawns.

Flowering Ash. See Fraxinus Ornus.

Flowering Currant. See Ribes sanguineum and Shrubs.

Flowering Rush. See Butomus umbellatus and Flower Gardens: The Water Garden.

Flower of the West Wind. See Zephyranthes.

Flower-pots. Pots are sold under number, according to the quantity in a cast, as follows:

Name	*Number in Cast*	*Top Width in inches*
Ones	1	20
Twos	2	18
Fours	4	15
Sixes	6	13
Eights	8	12
Twelves	12	11½
Sixteens	16	9½
Twenty-fours	24	8½
Thirty-twos	32	6
Forty-eights	48	4½
Sixties	60	3
Thumbs	80	2½
	167	

Clean flower-pots should always be used. New ones should be soaked in water a few hours.

Flowers, Cut, Gathering and Packing. It is a good principle to cut flowers regularly, except where seed is wanted, and there are few cases in which the plants are not benefited by it. Cutting the flowers while young prevents them from setting seed, which is the most exhausting process a plant undergoes; gathering is therefore an incentive to continuous flowering. There are, however, a few kinds that must only be cut with care and judgment, because the new growth springs from the base of the bloom-truss. Azaleas, Camellias, and Rhododendrons may be quoted as instances.

The cutting of flowers is often a bone of contention between employers and gardeners, the latter contending that the appearance of plants is spoiled by careless cutting. Gathering may, however, be done in such a way as to leave the effect of the plants unimpaired, and it should be done with discrimination. To gather a dozen flowers from one plant might affect a bed or border, but to gather 2 or 3 flowers from each of several plants would leave no gap.

Flowers of hard-wooded plants, such as Azaleas, keep longer if the base of the stem is lightly scraped with a knife before they are put in the vases. Flowers generally look best in vases and bowls when little mixing of kinds is done; there may, however, be judicious blending of colours, such as (1) red, white, and blue; (2) salmon and lavender; (3) cream and pink.

In packing flowers avoid using cotton wool, as it absorbs moisture. If this material is ever employed it should be in the form of a damp wad round the base of the stems. A little damp moss may be used in the same way. The flowers themselves should be dry, and should be packed firmly, preferably in tissue or butter paper. In cutting for show it is best to cut in the afternoon or evening, and keep the flowers in a cool, dark place, with the stems in water, until they can be set up on the boards.

Fly, Green, Black, etc. See Aphides.

Foam Flower. See Tiarella cordifolia.

Follicle. A single hollow carpel opening on one side to discharge the seed, as in Columbine.

Food of Plants. This important subject is considered under Manures, which see. See also Absorption and Assimilation.

Forcing. The act of inducing vegetables to come into bloom in advance of the usual time. Methods are stated under the plants concerned.

Foreright (Forthright) shoots. See Breastwood under Apples.

Forget-me-not. A delightful flower-garden favourite, best raised from seed annually (see Biennials), except in the case of the Alpine species, which may be sown as required, or increased by division. The Forget-me-nots are charming among late bulbs, planted in autumn and lifted after flowering in spring. For this purpose none is better than Myosotis dissitiflora, as it is dwarf and compact. There are several varieties of it. Sylvatica is taller, but very bright. Palustris is the best for damp places. Alpestris and its varieties are good for the rockery. See also Myosotis. For the New Zealand Forget-me-not see Myosotidium.

Fork. See Digging.

Formalin, Formaldehyde. Commercial formalin is sometimes recom-

mended as a remedy for plant diseases. It is liquid formaldehyde at 38 or 40 per cent strength. It is mentioned in connection with certain plants in the present work.

Forsythia, Golden Bell (fōr-sȳ-thia. Ord. Oleaceæ). One of the most useful deciduous shrubs, blooming very early in advance of the leaves, and wreathed in yellow flowers from top to bottom. Two species are popular, suspensa and viridissima. Atrocaulis, Fortunei and Sieboldi are varieties of suspensa. Intermedia is a hybrid between the two; densiflora is a modern form of it. They grow 6 to 8 ft. high. Any well-tilled, fertile soil suits them. They should be planted in autumn. After flowering, the old wood may be cut out to make room for young, which will flower the following year. Propagation is by cuttings in summer or layers in autumn.

Fothergilla (fŏth-er-gĭll-a. Ord. Hamamelideæ). The one species grown is Gardeni (alnifolia), of which there are several varieties, including major—the most popular. It is a deciduous shrub with downy leaves and small white scented flowers, which appear in spring in advance of the leaves, similarly to the related Witch Hazel (Hamamelis). It is grown to the best advantage in good loamy soil, with peat, on a wall. Propagation is by layering in autumn.

Foxglove. See Biennials and Digitalis.

Fragaria (fra-gā-ria. Ord. Rosaceæ). The species indica, which has yellow flowers in early summer, is grown on rockwork. Vesca semperflorens is the Alpine Strawberry. See Strawberry.

Frame. A frame is very useful in a garden. With a hotbed beneath it (see Hotbeds) it may be utilised for raising tender plants in spring, growing Cucumbers in summer, and forcing Violets in autumn. Unheated, it will prove serviceable for raising half-hardy plants and hardening garden plants which have been raised in heat. A 2-light frame, 18 ins. deep at the back and 14 ins. in front, each sash 6 ft. by 4 ft., will answer well. While glass is best for the lights, transparent oiled canvas is obtainable from seedsmen, and answers very well. A supply of Archangel mats for covering frames in very cold weather is desirable in some cases. See also Greenhouses.

Francoa, Bridal Wreath (frăn-cō-a. Ord. Saxifrageæ). The species ramosa is a graceful plant, with long, arching spikes of small white flowers. It thrives in a cool greenhouse, and when in bloom can be drafted into the window of a room, where it will overhang the other plants and impart a loose, pleasing effect. It can be raised from seed, which may be sown in a warm frame or greenhouse in spring, the seedlings pricked off, potted and repotted as needed. Five-inch pots will be large enough to flower them in, and loam, with a fourth of leafmould or decayed manure, and some sand, will do for compost. Appendiculata and sonchifolia, both with rosy purple flowers, 2 ft. high, are also obtainable.

Frankenia, Sea Heath (fran-kē-nia. Ord. Frankeniaceæ). Of the several species, the only one much grown is laevis, an evergreen trailer with wiry branches, bearing pink flowers in summer, suitable for the rockery, on which it will make dense carpets, especially near the sea and in sandy loam and peat. Propagation is by division in spring.

Fraxinella. See Dictamnus.

Fraxinus, Ash (frăx-in-us. Ord. Oleaceæ). The common Ash is

Fraxinus excelsior, a British tree, flowering in May, with very tough, flexible wood. There are many varieties of it, such as aucubaefolia, aurea, heterophylla variegata, and pendula. Americana is the White Ash. Ornus is the Manna or Flowering Ash. There are several varieties of both. See also Ash.

Freesia (frēēs-ia. Ord. Irideæ). The Freesia is one of the most fragrant of bulbs and a gem for blooming in winter and spring. By putting several bulbs an inch apart in 5-in. pots in bulb soil in autumn, placing them in a frame (not plunged in fibre), and bringing them into heat in batches, it is easy to get a long succession of bloom. The plants are nearly hardy, and may be used for an unheated greenhouse. They like a light, airy position, and plenty of water once the buds have formed. After flowering they should be dried off by degrees, and finally spread on a shelf in the sun to ripen. Refracta, orange, white and yellow, is the original kind. Leichtlini major has primrose flowers, and is a very strong grower. Many beautiful hybrids have been raised and can be obtained from specialist bulb-dealers. Freesias bloom from seed in about 14 months.

Fremontia (frē-mŏn-tia. Ord. Sterculiaceæ). The only species, californica, is a beautiful deciduous shrub, with large yellow flowers in June, growing 4 to 6 ft. high in a sheltered place. The brown stems and shoots are conspicuous. It likes a warm but not dry place, with sandy loam and leafmould. Increase may be effected by inserting cuttings in sandy soil in spring, preferably in bottom heat and covered with a bell-glass.

French Bean. See Bean.

French Gardening. What is known as French gardening is the concentrated manuring of the top spit of soil until it becomes a black mould, and the forcing in it under frames and cloches of a number of vegetables, mainly salads, that lend themselves to intensive culture. It is not wholly new to British gardeners; on the contrary, the main principles have been practised for many years, but less effort has been spent on the top soil, few cloches have been used, and the number of different salads has been smaller. French gardening in its most "intensified" form needs expensive equipment, and must not be entered upon without careful consideration. If walls and glass houses are erected (and protection of some kind is absolutely necessary) and the garden is well equipped with pits, frames, and adequate heating, the cost may be expected to be at least £1000 per acre. This would not be justified unless there was a good market for the produce, hence the necessity of caution.

The principal appliances required for a French garden are reed mats, which must be dressed with Bordeaux Mixture as a fungicide and preservative, frames, and cloches. The principal crops grown are Cauliflowers, Cucumbers, Melons, Tomatoes, Chicory, Spinach, Parsley, Lettuces, Mushrooms, Radishes, Endive, Beans, Carrots, and Turnips. Attention must be given to cropping the ground successionally.

Those who are embarking capital in French gardening should consult a reliable work on the subject.

French Honeysuckle. See Hedysarum.

French Marigold. See Marigold.

Fringe Tree. See Chionanthus.

Fritillaria, Snake's Head Lily, Crown Imperial (frĭt-ill-ā-ria. Ord.

Liliaceæ). The species Meleagris is the Snake's Head Lily. Imperialis is the Crown Imperial, which see. The chequered lilac flowers of Meleagris have a subdued and composed appearance. There is nothing brilliant and assertive about them, but they are quaint and pleasing. They droop on their stems at a height of about 1 ft. from the ground. The Snake's Head looks very well in grass, and it may be grown on the rockery, or near the front of the border. Well-drained sandy soil should be provided, and the bulbs may be put 4 ins. deep in autumn. White and pink varieties are procurable. Armena with purple flowers, 4 ins., and its yellow variety; aurea, yellow, 4 ins.; and recurva, red and yellow, 9 ins., are all good Fritillarias for the rockery, and bloom in spring. Pudica, yellow drooping bells, 4 ins., is charming.

Fronds. The parts of ferns corresponding (to some extent) to leaves. See also Ferns.

Frost. Frost is most likely to occur on autumn, winter, or spring nights, when the sky is clear, and heat escapes from the earth by radiation. In cloudy weather this radiation is checked. Frost is likely to be most severe on low sites, because cold air rolls down to valleys from higher regions; but the presence of a body of water modifies this and tends to equalise temperatures. If non-hardy plants are frozen they should not be exposed to the sun, but should be syringed. Plants in unheated houses should be dry before evening, as there is then less danger of injury from frost. A few sheets of newspaper will protect the plants from mild frost. Frost often threatens heavy loss to commercial fruit-growers, and " Smudge fires " are sometimes used by them to protect blossom, cotton waste being burned in Colorado heaters, of which 40 to 50 are required per acre. The stigma of Apple-blossom is watery and tends to suffer at 29°, but much depends on other conditions; dry frost is less dangerous than frost with sleet. Frost does good service in other directions: it acts beneficially on heavy soil, because with the moisture in the soil expanding when frozen, the stiff masses are disintegrated and the soil becomes friable. This was markedly the case after the severe winter of 1928–9, when the heaviest of soils crumbled like sand; nor did they crack in the summer drought which followed.

FRUIT: PLANNING, PRUNING, SELECTIONS, ETC.

A supply of fruit should be regarded as indispensable in all but the smallest gardens, and even in these it is possible to grow a few trees, either as bushes on dwarfing stocks, as cordons on a wall or fence, or as fans on a wall. Apples, Pears, Plums, Cherries, Apricots, Damsons, Currants, Gooseberries, Raspberries, and Strawberries all claim attention; while Peaches, Grapes, Loganberries, and Blackberries have also to be considered. Crabs, Damsons, Figs, Melons, Mulberries, Nuts, Oranges, and Quinces swell the list.

Planning. It is not common to find an elaborately planned fruit garden in a private place, for the reason that most of the trees are accommodated on walls and in borders. If there is a special fruit area, it is generally an orchard of standard trees on grass. But wherever there is a fairly large and open piece of ground for which there is no special want, an assortment of fruits might be planted with advantage. For example, standard Apples of selected varieties

could be planted 30 ft. apart and half-standards or bush Apples, Pears, Plums, and Cherries planted 15 ft. apart between them. It would be several years before these trees required all the space, and meanwhile Currants and Gooseberries could be planted 7½ ft. apart between. Half an acre, or even less, planted with fruit trees on this principle would yield an appreciable quantity of different kinds of fruits. But the grower should resist the temptation to which nearly all owners of fruit plantations succumb, that is, crowding vegetables between the trees so thickly that the whole ground up to the stems is covered. It pays better in the end to keep the ground clear, because the trees bear sooner and better. Especially is this the case where the soil is not of the best. To make matters worse, it is generally coarse, strong-growing greens, such as Brussels Sprouts, which are associated with the trees. It would be less objectionable to broadcast Turnips, which do not spread so much, make lighter demands on the food in the soil, and smother weeds. Or Strawberries might be grown for the first three years.

Another plan with much to recommend it is to plant half-standard trees 24 ft. apart, and fill the space between them for a few years with small bushes, keeping the ground clean with a cultivator.

The simplest plan of all for growers with plenty of ground and adequate capital is to plant standards 24 to 30 ft. apart in grass, and put sheep in. The principal drawback is that except in the best of soils the trees grow much more slowly than in cultivated soil; moreover, the stems must be protected from the sheep. Alternatively to sheep, crops of hay may be taken, in which case the turf should be manured well every three years.

Site. The site of the fruit orchard or plantation is not very material if the garden is open and level, but if it contains slopes, one with a southern or western aspect should be chosen in preference to a northern or an eastern; a southern slope with very little easting in it is suitable. Windswept places are bad, and so are low spots. Strong winds worry the trees and blow the fruit off. In low sites frost is liable to do damage to the blossom, but a body of water near is a preventive. A south-easterly aspect is unsuitable, because the sun may strike direct on to the trees while the bloom is touched by frost, and destroy the crop. For this reason a south-westerly aspect is better. A low, damp site on heavy soil is unfavourable, because roots do not spread freely and moss and lichen are encouraged.

Soil. A cold subsoil is bad for all kinds of fruit trees; it is therefore imprudent to plant in damp, undrained ground. If a low site is unavoidable, drain-pipes should be laid in 3 ft. deep, provided there is an outlet for the water. The best soil for fruit is a reddish, substantial loam; the least suitable soils are heavy, undrained damp clay and light, fibreless land close to chalk. The soil should be dug or ploughed deeply.

Where the conditions are wholly favourable—warm aspect, well-drained, fertile soil—it may pay the grower to put down an acre or two of a special fruit, such as Cox's Orange Pippin Apple; for in such circumstances a very profitable return may be secured. A few rows of Worcester Pearmain should be planted among the Cox's for the sake of the pollen.

Fruit with Vegetables. In small gardens, the fruit trees are generally associated with the vegetables in the kitchen garden. Here they are accommodated as bushes or pyramids beside the paths, as cordons or fans on walls, as espaliers on wires skirting the walks, as ramblers (particularly in the case of Loganberries and Blackberries) on arches and trellises, and as canes, e.g. Raspberries and hybrid berries, on stakes. Just as on the outside of the circumferential path the gardener has his borders for small vegetable crops, so on the inside he can have borders for fruit if he thinks proper, the vegetables occupying the main central spaces of each section.

Strawberries may be worked in with the vegetable rotations if desired, making a new bed every two years at most; many successful gardeners only fruit a bed once.

The most perplexing matter for the small gardener to decide is the kind of fruit and type of tree to choose. The 10-rod man can grow quite respectable quantities of all the most important vegetables (see Allotments), and he can even provide himself with successions of several by sowing both early and late varieties; but a fruit tree is a different proposition from a Cabbage. The most compact variety of Apple grown as a bush needs 7 square yards of ground to do itself full justice, while Plums and Pears call for more. There remain Cherries, Gooseberries, Currants, Raspberries, and Strawberries of the most popular kinds, with a few in reserve that are quite worthy of inclusion. Decidedly fruit-growing is a different proposition from vegetable culture; let us, however, see what can be done.

Cordons. In the smallest of gardens there is but one way of solving the problem of getting not only several kinds, but several varieties of each, and that is to substitute the cordon for the bush system. With the single-stem principle under adoption, each cordon calls for no more than half a square yard of ground. Of course it does not bear so much fruit in any one season, but on the whole it bears more regularly, and on an aggregate of several seasons the balance is not heavily against it. A more serious obstacle to its general adoption is the greatly increased cost of filling a given area of ground, because not only are there more trees to buy, but there are supports to provide, cordon trees not being self-supporting. The fruit-grower cannot have it all ways; as with the rest of us, he has to strike a balance between contending factors. But it is something to know that however small the garden may be, there is room for fruit trees in it.

In making up a small collection of cordon trees, to include Apples, Pears, Plums, and Cherries, we might select 24 Apples, 12 Pears, 6 Plums, and 6 Cherries. We could have 4 trees each of 6 Apples, 2 each of 6 Pears, 2 each of 3 Plums, and 2 each of 3 Cherries. This gives us the opportunity of providing for a succession of fruit without reducing the quantity of each to a negligible amount. Our Apples might be Early Victoria (Emneth Early), Lord Derby, Stirling Castle, Lane's Prince Albert for a succession of culinary varieties; Worcester Pearmain and Cox's Orange Pippin for successional dessert varieties. By growing a smaller number of trees of each we could lengthen our list to bring in such useful sorts as Potts's Seedling, Bismarck, Peasgood's Nonsuch, Warner's King, Golden Spire, Newton Wonder, Gladstone, James Grieve, and King of the Pippins, but this is a matter of taste, which each grower can decide for himself.

Our Pears could be Jargonelle, Williams's Bon Chrêtien, Beurré Hardy, Louise Bonne of Jersey, Doyenné du Comice, and Glou Morceau, with extension to bring in Conference, Marie Louise, Beurré d'Amanlis, Pitmaston Duchess, Josephine de Malines, and Easter Beurré if more variety and less quantity of each appealed to the grower. Our Plums could be Czar, Victoria, and Jefferson's Gage. Our Cherries could be Early Rivers, Napoleon, and Black Eagle. And, incredible though it may seem, all the foregoing could be got into a piece of ground equivalent to 1 square rod (30¼ square yards) in area without crowding.

Stakes to support the cordons may be economised by reducing the number and using wire. The stakes must be tough and seasoned and the base must be dressed with tar, creosote, or some other preservative, or renewal will soon be necessary. If the rows are 4 ft. apart and the trees 18 ins. apart, it will suffice.

Here we have *multum in parvo* fruit-growing, absolutely satisfactory, full of interest, with nothing laborious about it after the first soil-preparation and planting, including stake-driving, is done. It is a system easily within the compass of thousands of people who are now languishing for a hobby which will be at the same time inexpensive, interesting, and free from strain, either of mind or body. A start can be made at any time between the end of October and the end of March, provided the weather is not too wet or frosty. Admirable, it will be seen, to follow up the summer operations among the vegetables.

A constant succession of fruit can thus be had from July to March in small quantities, for several of our chosen Apples and Pears are keepers.

Classification of Fruits for Pruning. The pruning of the various kinds of fruit trees is not quite the same in detail, but there is not a great deal of difference in principle; what there is turning on the extent to which the tree bears on young or old wood. The slightest consideration suffices to teach the pruner that if one kind of tree bears mainly on wood a year old and another on wood two or more years old, some difference in pruning is likely to be necessary. We cannot give a beginner a better guide to the principles of pruning than to suggest that he begin by classifying the kinds which he may be growing into two sections: young-wood bearers and old-wood bearers. Here they are:

Young-wood Bearers. A few varieties of Apple, all Peaches and Nectarines, all Black Currants, Morello and Kentish Cherries, Raspberries, Loganberries, Gooseberries (to some extent).

Old-wood Bearers. Most Apples, all Pears and Plums, most Cherries, but not Morello or Kentish Cherries, Red and White Currants, Apricots (chiefly), Gooseberries (to some extent).

By " young wood " is here meant wood in the second year of its growth, in short, wood which is formed one year and bears the next. (The production of fruit on wood the same year that it forms, as Roses bloom, is abnormal.) By " old wood " is meant wood which does not bear until at least the second year after formation. The principle of pruning the former class is to cut out the fruiting shoots as soon as the fruit has been gathered, and of the latter to cut out most or all the young wood annually, leaving only the ripe wood.

Foundation Pruning. It would save the student some amount of work if fresh wood of all fruits sprang direct from the ground annually and all fruits bore like a Raspberry, because then he would understand clearly that all he had to do was to cut out a complete set of canes each year after they had fruited, retaining new shoots for bearing the following year, but the habit of the Raspberry is exceptional among fruits, only the Loganberry, of all those named, coming near to it. With the others in the two lists, there is the framework of the tree to consider; that is, the foundation wood which carries the fruiting wood. And the foundation wood may prove somewhat perplexing, especially if the grower comes into possession of trees which have been planted for a good many years and have developed a constitution, which may be good or bad. Whether the fruit is a young-wood or an old-wood bearer, the foundation wood must be there to carry it, or we have no real tree or bush.

Broadly, the foundation wood consists of the bole or main stem, the primary forks from it, and the secondary forks. The bole is formed from the bud or graft which is put on to the Paradise or other stock by the nurseryman who propagates the tree (see Budding and Grafting), and which, after the extension of one complete growing season, is shortened to within half a yard of the ground, except in the case of standard trees. The primary forks are the branches which result from the shortening referred to. The secondary forks are the branches which result from the shortening to one-third of their length of the primary forks at the end of a complete growing season. In a word, the tree is built up by stages. It is given a foundation by pruning back in two successive years. What if the foundation work is omitted? The tree will be straggling and top-heavy. It will bear no fruit anywhere near the ground. Therefore, practically all fruit trees require shortening when young. If they are allowed to grow right away from the bud or graft they make lank growth, and the lower part of the tree is bare. A first-year (" maiden ") to form a bush should be pruned back to 18 ins. high in winter, or before it starts growing in spring. A 2-year-old tree should have its side branches shortened to one-third their length.

A would-be fruit-grower who buys a tree two years old finds that the foundation work has to some extent been done by the nurseryman who sold it to him; nevertheless, another shortening to at least one-half the length is desirable after planting, giving a tertiary set of forks. Nursery trees four years old or more need not be pruned back after planting, but they should be relieved of most of their fruit the first year, in order to give them a chance to concentrate all their energies on rooting.

Good foundation pruning is the making of a fruit tree, and ought never to be omitted. Call, in August or September if possible (see under Apples), at the nursery where the trees are to be bought and note the uniform structure of the foundation tree. It is trim and orderly. It is developing under a considered plan. You see it in its different stages: the first growth from the bud, the first fork, the second fork, and the third fork in the case of the older trees. The various stages teach an unforgettable lesson. The trees are there in their thousands, all kinds and all the best-known varieties. Truly the nursery garden is the place to learn the first lesson in

pruning. Perhaps some particular trees give the visitor special satisfaction. Very well, let him ask for tallies bearing his name to be put on them forthwith, and a few weeks later those very trees will be his own, at the catalogue price.

Having given his order, he will have justified his presence at the nursery and may proceed without compunction to follow up what he has learned about the foundation tree by an examination of the older fruit trees which the nurseryman is sure to have. And he will then perceive how the foundation system and the fruiting system are blended. Fresh from a study of the 2- or 3-year-old Apple tree, he will be able to study the 4-, 5-, 6-, or perhaps 10-year-old tree of the same variety, and will be able to trace the stages by which it has developed. He will soon be able to indicate the points where the tree was shortened, even if the marks are quite overgrown. The bifurcation of the branches will teach him where the pruning has been done. Thenceforth he is in a fair way to becoming a master of his subject.

Summer Pruning. This does not concern shortening the main branches of young trees to get a good head, but deals with the summer side shoots of older trees to get fruit. It is a good practice, because it exposes the wood to the sun and accelerates ripening. Those who want to grow exhibition fruit, and have plenty of time, may pinch off the tips of the side shoots at the end of May, and six weeks later serve the secondary shoots in the same way; but busy people and market-growers should make one pruning suffice, and do it from mid-August to mid-September. This applies to most varieties of Apples, and to Pears.

Manure. Fruit trees are generally manured heavily at planting, and receive little food when they have got into bearing. The reverse would be better. In rich, loamy soils, 20 tons of manure per acre, or 1 barrow-load per rod, suffice at planting. In poor ground at least double may be used. When the trees have got into regular bearing a coat of manure may be spread round them every other year, alternately with a dressing of artificial manure, such as 2 lb. of sulphate of potash and 5 lb. of basic slag (superphosphate instead of the latter on limestone soils) per rod, applied in February and raked in.

Grass. Only in good soil districts should the fruit trees be planted in grass, and where they are so planted wide holes should be made, and the surface soil kept open until the trees are well established.

Planting. November is a good planting month, as the soil has not lost all its summer warmth, but if the ground is very wet it is better to plant later, and it may be done up to the end of March. Standard trees should be set 24 ft. apart, the distance to be increased to 30 ft. for Bramley's Seedling, Newton Wonder, Emperor Alexander, Blenheim Orange, and other strong Apples, also for Plums and Cherries. Half-standards should be 18 ft. to 24 ft. apart. Bush and pyramid trees on dwarfing stocks may be 9 ft. to 12 ft. apart.

Types of Tree. The most popular types are the standard, the half-standard, the bush, the pyramid, the fan, the espalier, and the cordon. Standards and half-standards have clean, straight stems about 6 ft. and 3 ft. high respectively. They are generally raised by inserting a bud in the main stem of a stock (for best stocks, see the various fruits) a few inches above the ground in summer. If the

bud dries up, the stock is cut back to about 6 ins. and whip-grafted (see Apples and Grafting) the following spring. Some nurserymen supply standards with fruit spurs on the stems, and these spurs may be kept for a few years, but should be gradually cleared away as the heads extend. Bushes and pyramids are generally put on dwarfing stocks by budding or grafting. Bushes are gradually supplanting standards, except with market-growers. They are better than standards for small gardens, and come into bearing sooner. Fans are good for walls, especially in the case of Plums, Cherries, and Peaches. Espaliers are trees with several tiers of horizontal branches, and are very good for growing on strained wires at the side of walks. Cordons take up the least room of all. They are trees with only one stem, and may be planted diagonally 18 ins. apart against a wall or fence. They are prevented from making side branches, and are kept fruitful by summer pruning. Horizontal cordons suitable for training on low strained wires are procurable. The following table summarises the types:

Type of Tree	*Situation suitable*	*Distance apart in ft.*	*No. per acre*	*When to Prune*
Standard Apple, Pear, Plum, or Cherry	Open plantation or orchard on grass	30	48	November to March
Half-Standards of above kinds	Ditto	18	134	Ditto
Bushes or pyramids of above (vigorous varieties)	Plantations or large garden borders	15	193	Ditto
Bushes or pyramids of above (small varieties)	Garden borders	9	537	Ditto
Fan Peaches, Nectarines, and Cherries	Walls	15		Spring and summer
Espalier Apples, etc.	Wires beside walks	15		August, winter
Cordon Apples, etc.	Walks and wires	1½		August, winter
Bush Currants and Gooseberries	Plantations and borders	7	889	Late winter
Cordon ditto	Walls and wires	1		August, winter
Raspberries	Borders on stakes	rows 4 ft. stools 2 ft.	5445	August
Strawberries	Beds	3 ft. by 2ft.	7260	Clean beds in late summer, dressing off old leaves

Staking. Standards need staking, and half-standards are the better for it. Strong ash stakes about 18 ins. longer than the stems are needed. The lower end should be pointed, tarred, and after drying, driven well down at the time the hole is made for planting. At the point where the ligature is put, a piece of old bicycle tyre or other protective substance should be wrapped round the stem to prevent chafing.

Supports for Trained Trees. Bushes and pyramids do not need supports, but fans, espaliers, and cordons do. In the case of walls, shreds and nails may be used, and the fruit-dealer or seedsman will supply suitable kinds of both. Otherwise, wire comes into play. One wire fixed at 2 ft. above the ground will support horizontal cordons, which, however, are inferior to upright ones. Upright cordons, and also espaliers, may be supported on tiers of wire strained 1 ft. apart to a total height of 6 or 7 ft. Fruit-dealers, seedsmen, and ironmongers supply strong metal straining-posts, with keys for tightening the wires. Wooden posts may, however, be used, provided the straining-post is made absolutely immovable; if it yields only 2 or 3 ins. the wires will be slack. It should be a strong, thick post that will hold stiff from bottom to top when well bedded in. Single wire will do, although strand wire is often used. It should be unwound from a reel, otherwise it will run into bends and be full of kinks before the work is finished.

Root Pruning. When fruit trees have been planted 2 or 3 years it sometimes happens that they grow far too strongly, especially if the soil is rich and the summers are wet. To use figures as a guide, if the summer shoots grow over a yard in length fruitfulness is jeopardised, because when a tree makes coarse wood it does not, as a rule, form fruit buds. The remedy is not cutting back the gross wood, which only causes back buds to start and so aggravates the evil, but to prune the roots in winter when the tree is at rest. The soil should be forked away from the roots carefully, and the strong, deep-striking roots cut through a couple of feet from the bole. Fibrous roots may be left. In the case of a large tree growing in the open, it will be prudent to restrict the pruning to a half-circuit of the tree; if this does not suffice, the circle may be completed the following winter.

Fruit Trees in Pots. When fruit trees are grown in large pots or tubs they bear heavy crops in proportion to their size the bloom is protected from frost, and the fruit from birds. Heated houses are not required. The structures should be large, airy, light, and well ventilated. Apples, Pears, Plums, Cherries, Peaches, and Nectarines can all be grown successfully as bushes in 10- and 12-in. pots. The soil may be decayed turf with a fourth of decayed manure and some grit. Every other year will suffice for repotting; in the alternate years the top 2 ins. of soil and hair roots may be torn out, and a top dressing of fresh mould rammed in. The trees may stand out of doors in summer after the fruit has been gathered to ripen the wood, indeed they may be left out all the winter, with the pots packed in coal ashes, if the house is wanted for something else, and housed when they come into bloom in spring. Watering and keeping free from insects and fungi must be attended to in the growing

season. Liquid manure will improve the crop. Six or eight main branches will suffice, and the side shoots may be summer pruned and spurred (see under Apples).

Labelling. All fruit trees should be labelled, or their names and positions in the garden marked on a plan. But wire should not be fastened round a young branch and forgotten, or it will become embedded as the tree grows.

Gathering. Generally speaking, fruit should be gathered as soon as it parts from the tree under gentle pressure on the stalk. Late varieties do not ripen on the trees, and should be gathered before sharp frost comes. The fruit should be placed in the receptacles gently, as if bruised it will not keep.

Storing. All the important fruits, except Apples, Pears, and Grapes, are either used at once or preserved. Late Apples and Pears will keep for several months in a cool, airy, frost-proof place if spread thinly on clean boards. Grapes may be kept a long time if cut with a portion of the lateral and this placed in a bottle of water.

Cold Storage. In order to keep Apples sound during periods of unfavourable market prices, as in years of glut, and so be able to put them on the market when prices improve, large growers adopt cold storage. This is effected by compressing carbon dioxide (carbonic acid gas) by means of an engine in an external set of coils, and then passing it to coils within the store, where it expands and absorbs heat. A fan draws air over the internal coils, and circulates it through the chambers, which are surrounded by 9-in. wooden cavity walls packed with silicate cotton. Extreme cold is not needed; a temperature just above freezing point (32°) suffices.

Hybrid Fruits. There are several hybrid fruits available, the most important of which are dealt with under their own names in this work. The Loganberry is one. The Strawberry-Raspberry is of no importance, as the flavour is very poor. It is a Japanese plant, a hardy herbaceous perennial, with white, perfumed flowers. The berries are globular and dark in colour, and are borne on the new wood. The reputed origin—a cross between Strawberry and Raspberry—is very doubtful. The Japanese Wineberry is a species (Rubus phoenicolasius), and is a hardy shrub, which bears red fruit in clusters, ripe in summer. It is juicy and sweet and makes a good preserve. The Austen Dewberry is a large form with black fruit of good flavour; it thrives in damp sites. The Mahdi is a hybrid between Raspberry and Blackberry, and bears dark Raspberry-like fruit of good flavour. The Lowberry is also a good hybrid. Others are the Hailsham Berry and the Veitchberry. The Himalayan Giant is a species and produces very strong spiny canes.

For other remarks on the various fruits see the alphabetical lists of subjects treated in the book—Apple, Apricot, Cherry, Grape, etc. The enemies of the different fruits are there treated.

Fuchsia (fū-chsia. Ord. Onagrarieæ). This graceful plant has still many admirers, although it no longer enjoys the special favour which attended it in years gone by. There are few plants more elegant and pleasing, and the culture is not difficult. Bud-dropping is the only serious defect, and that can be avoided with care in watering

(see Watering). The Fuchsia thrives in a cool greenhouse in summer, and may be grown as a window plant with success if properly watered and ventilated. When pushed on by repotting, specimens of great size may be grown, and such plants, 6 or 7 ft. high and laden with flowers, are very beautiful objects; but smaller plants in 5-in. or 6-in. pots are more useful to most people.

Propagation. By striking cuttings of young shoots about 3 ins. long in sandy compost in spring; they root more surely if covered by a bell-glass. When 6 ins. high the tops may be pinched off, and freely-branched plants will follow.

Compost. 3 parts loam, 1 part leafmould, and one-tenth part sand will suit them.

With adequate moisture the plants will grow rapidly, and soon come into bloom.

After Flowering. At the end of the season the water-supply should be reduced and the plants brought to rest. They can be stored in any dry, frost-proof place for the winter; and in spring can be retarded by being put in a warm house and syringed. They may then be pruned hard back to encourage a fresh lot of shoots from the base. In addition to the many florists' varieties, the species corymbiflora, scarlet, and its white variety, are sometimes grown under glass.

Hardy Species. These are often used for the garden, and come up year after year, making large bushes in mild districts. In cold places it is well to put some litter over the roots after cutting the plants down in autumn. The following are good: macrostema corallina, coral, the best; macrostema gracilis, purplish-red; macrostema Riccartoni, scarlet.

For the Californian Fuchsia see Zauschneria.

Fumigation. The burning of tobacco-paper in plant-houses, which is what gardeners understand by fumigation, has largely given place to vaporisation with cones or other appliances containing a preparation of nicotine. They are sold by seedsmen and florists. One or other should be practised periodically, say once a fortnight, through the growing season, to prevent insect pests getting established.

Fungi, Fungicide. A fungus is a low vegetable organism devoid of chlorophyll, and deriving its nitrogen and carbon from a host plant living or dead. There are large numbers of fungi which feed on living plants, and they are called parasites. Those which live on dead or decaying matter are termed saprophytes. Many fungi are injurious to plants and are dealt with under the kinds which they attack. Bordeaux Mixture (which see) is one of the best of fungicides. Sulphide of potassium is also good. Dry flowers of sulphur destroys mildew. Fostite, Strawsonite, Vermorite, and Woburn Bordeaux paste are good proprietary fungicides. Condy's fluid diluted with water to a pale pink colour is safe and good.

Funkia, Plantain Lily (fŭn-kia. Ord. Liliaceæ). The bulb-dealer handles this pretty, broad-leaved, Lily-like plant, which thrives in shady places, and looks well near the front of the herbaceous border. The variegated-leaved varieties look well in pots in conservatories and rooms. They may be potted in ordinary bulb compost, such as loam, leafmould and sand, in autumn. Fortunei and subcordata grandiflora are two of the best plain-leaved forms for the garden. Lancifolia (undulata) variegata is a pretty striped sort. Ovata and

its mottled and variegated forms, glauca and Sieboldiana, are also popular.

Furze, Gorse, or Whin. The common Furze is Ulex europaeus (Ord. Leguminosæ). It is a well-known occupant of heathy, sandy wastes, and is in bloom many months of the year. The double-flowered (flore pleno) is particularly good; it may be grown in the garden in sandy soil, and propagated by cuttings in spring or autumn. Strictus, the Irish Furze, is a variety of europaeus, but is not a free bloomer. Nanus is a dwarf species, blooming in autumn.

G

Gaillardia (gaill-ārd-ia. Ord. Compositæ). Annuals and perennials, with rich brown and yellow flowers, borne freely in summer. The annuals are varieties of pulchella picta, sold in separate colours and mixed packets by seedsmen, and suitable for sowing outside in ordinary soil in spring. Lorenziana is a form of picta with tubular florets. The perennial Gaillardias, of which named varieties are becoming known, are hybrids of G. aristata, and may be propagated by division, or by cuttings in autumn kept in a frame through the winter; but they bloom the same year if treated as half-hardy annuals, that is, sown under glass in February, set out 3 or 4 ins. apart in shallow boxes, and planted out in May. They are handsome plants for the herbaceous border, and are not particular as to soil. Gaillardias are very suitable for cut bloom.

Galanthus, Snowdrop (gă-lăn-thus. Ord. Amaryllideæ). The species nivalis and its double form plena are respectively the single and double English Snowdrops. Alleni, Ewesii, cilicicus, and Imperati are fine species. See Snowdrop.

Galax (gā-lax. Ord. Diapensiaceæ). One member of this genus is grown, and that is aphylla, a pretty hardy rockery plant, attractive both in leaf and bloom. Its white flowers are borne in summer. It likes a very friable soil, such as leafmould with a fourth of loam and a good deal of grit. Propagation is by division in autumn.

Galega, Goat's Rue (gă-lē-ga. Ord. Leguminosæ). One of our most brilliant and vigorous hardy herbaceous perennials, thriving anywhere and easily propagated by division between November and April, height 4 to 6 ft. Both the lilac species officinalis and its white variety alba should be grown. The variegated-leaved (Hartlandii) may also be grown if desired, as it is a distinct plant in spring, but apt to become green when in full vigour in summer, especially in rich soil.

Galingale (Cyperus longus). This graceful British plant is worth growing beside water in gardens. The brown flowers are produced late in summer. Propagation is by division.

Galls. Abnormal structures on plants often arise from the action of fungi or insects. Bedeguars on Roses, witches' brooms on various trees, blister on Peach leaves (see Peach), and oak-apples are cases in point. The fluids excreted by galls stimulate the protoplasm and thereby bring about changes in its action.

Gall-weevil. This is the insect (Ceutorhynchus sulcicollis) which produces the whitish swellings, about the size of acorns, which may be found on the lower parts of the stem and roots of sickly Greens. See remedies under Broccoli. It is different from Club-root.

Galtonia (gal-tō-nia. Ord. Liliaceæ). The species candicans (Hyacinthus candicans) is a graceful bulbous plant with long bright green leaves, throwing up flower-stems 4 to 6 ft. high late in summer, and

bearing numerous white tubular drooping flowers. A strong clump is an object of considerable beauty in the border. Bulbs may be obtained in winter and planted 9 ins. apart in clusters of 3 to 12, according to the space available. This handsome plant will thrive in ordinary friable soil, and any offsets which form may be taken off and planted to increase stock; but the clumps tend to dwindle unless the soil is renewed or enriched every few years. Fresh loam, decayed manure or leafmould may be used for the purpose.

Gamolepis (gă-mo-lē-pis. Ord. Compositæ). The annual species annua, yellow flowers in late spring, 1 ft. high, is offered by seedsmen. Treat as a half-hardy annual. See Annuals.

Gardenia (gār-dē-nia. Ord. Rubiaceæ). Producing white, strongly-scented flowers of neat shape and convenient size, Gardenia florida is a popular buttonhole flower. It thrives in a moist atmosphere, and does best when planted out; it may, however, be grown in pots, 6-in. and 7-in. being suitable sizes. A compost of loam 3 parts, leafmould and dried cow manure 1 part each, with sand, suits it. A temperature of 60° to 70° should be provided in winter. Propagation is by cuttings inserted under a bell-glass in bottom heat in spring. There are several varieties, of which the double white is the best known. Variegata has yellow-margined leaves. Others are Fortuneana and radicans.

Garlic (Allium sativum). A white-bulbed member of the Onion tribe, generally treated in the same way as Shallots, i.e. bulbs ("cloves") are planted in late winter about 1 ft. apart, sprinkled with ashes to keep off worms, and the crop lifted and ripened in summer. The flavour is strong and pungent.

Garrya (garry-a. Ord. Cornaceæ). The one species grown to any extent, elliptica, is a hardy evergreen shrub growing up to 8 ft. high, producing yellow flowers in winter or early spring. It is not particular as to soil if sandy and light, but is the better for a sheltered spot. In cold districts it should be planted on a wall in spring. Propagation is by cuttings under a bell-glass in September; or by layering in autumn.

Gas-lime. See Lime, also enemies of Greens under Broccoli.

Gaultheria, Wintergreen (gāul-thē-ria. Ord. Ericaceæ). One or two members of this small genus are esteemed for the rock garden. They are low evergreen shrubs that thrive in peaty soil and are propagated by layers. Procumbens, the Partridge Berry, has white bell-shaped flowers in July, followed by red berries, which with the warm tints of the foliage in autumn, make a very attractive carpet. Shallon has white flowers in spring, followed by purple berries. Two interesting modern species are Forrestii, white purple berries; and Veitchiana, white, indigo fruits.

Gaura (gāur-a. Ord. Onagrarieæ). The species Lindheimeri, a perennial best treated as an annual, with spikes of rose and white flowers in summer, 3 ft. high, is an elegant plant. Sow outside in ordinary soil in spring.

Gazania (gă-zā-nia. Ord. Compositæ). Half-hardy perennials suitable for the flower garden in summer. Splendens is the most commonly grown, and it bears orange flowers. Height 6 ins. Ordinary friable soil suits it, and it may be propagated by cuttings under a bell-glass in summer. This showy old plant is much favoured by town

gardeners at popular seaside places, where it makes a blazing display in summer in beds of chalky soil. The less familiar species pygmaea also has yellow flowers.

Genista, Rock Broom (gen-ĭs-ta. Ord. Leguminosæ). These evergreens are allied to Cytisus. They are easily grown, thriving in most soils which are sandy and light, and propagated by cuttings in a frame. Hispanica, yellow fragrant flowers, height 2 ft., the Spanish Broom; tinctoria, flore pleno, a double variety of the Dyer's Greenweed; Aetnensis, yellow flowers in summer, height 6–10 ft.; cinerea, clusters of yellow flowers in summer, 3–6 ft.; and virgata, racemes of yellow flowers, 4–10 ft., are the principal sorts. The plant grown in pots for greenhouse decoration under the name of Genista racemosa is correctly Cytisus racemosus; and the early yellow Genista prostrata praecox is Cytisus procumbens; it is a good plant for the rock garden. Plant in autumn or spring. See also Broom and Cytisus.

Gentiana, Gentian (genti-ā-na. Ord. Gentianeæ). The Gentians are among the most valuable of Alpines, on account of the brilliant blue flowers of many of the best species, which are unexcelled for richness of colour. "Gentian-blue" has become a popular expression to indicate brilliance. The Alpine species like a peaty soil. They may be raised from seed in a greenhouse in spring, or divided in spring. There are no choicer flowers for rockwork. The following are some of the principal of the older species:

Acaulis, blue, spring, 4 ins. high.
Andrewsii, blue, summer, 2 ft.
,, alba, white.
Asclepiadea, blue, early summer, 1 ft.
,, alba, white.
Bavarica, blue, summer, 3 ins.
Freyniana, large blue, 6 ins., July.
Lutea, yellow, summer, 2 ft., yields the commercial gentian.
Pneumonanthe (Calathian Violet), blue, likes a cool moist spot.
Przewalskii, dwarf, deep blue.
Septemfida, blue, summer, 9 ins. Latifolia is a fine variety.
Verna, blue, spring, 3 ins.
Walujewi, blue and white, early summer.

During recent years several Gentians have been introduced from the Far East. Lagodechiana and Purdomi may be mentioned as good August bloomers. The former resembles septemfida, and makes beautiful masses 5 or 6 ins. high in full sun. The latter seems to enjoy partial shade. Both are blue. Farreri, blue with white throat, is another gem for a cool, moist place. Sino-ornata, rich blue, is valuable as flowering into autumn.

Gentianella. See Gentiana acaulis.

Geonoma (jeon-ō-ma. Ord. Palmæ). Geonoma gracilis is one of the best of room plants, and should be included in any collection of palms grown in small pots. For culture see Palms.

Geranium, Cranesbill (ger-ā-nium. Ord. Geraniaceæ). The true Geraniums are hardy herbaceous plants, with bright flowers in summer. They are not particular as to soil, and are easily propagated by division in spring, also by seeds.

Hardy Species. Such species as argenteum, with light red flowers and silvery leaves, 6 ins.; armenum, purple, 2 ft.; Endressi, rose,

1½ ft.; sanguineum, crimson, and its variety lancastriense, rose striped, 1 ft., are hardy, and are worth growing in every herbaceous border, while the dwarfer kinds are suitable for the rockery. Pratense, blue, and its forms, 1 ft; Londesii, purple, 2 ft.; and Wallichianum, striped, 9 ins., may also be mentioned. They thrive in any good garden soil, and may be increased by division in spring or raised from seed.

The Zonal Geranium. The plant which we grow for beds and ribbon borders in summer, as a pot plant for both summer and winter, and as a window-box ornament for the warm season, is not a true Geranium, but a Pelargonium. Most of the modern varieties of what we call Geraniums were derived from Pelargonium Zonale and P. inquinans. They are distinguished from other Pelargoniums by having a marked leaf, hence the term Zonal; if this is used regularly there is no fear of confusion. The Zonal Geraniums do not hold entire sway in the flower garden now, as they did in years gone by; but they are still used largely. A start may be made by buying a stock of young plants about the middle of May, which may be planted 18 ins. apart in well-dug but not heavily manured soil. These will flower continuously through the summer, unless it is very wet. Pick off decaying trusses regularly; fresh ones are thrown up continuously.

Propagation. About mid-August a piece of ground in a sunny spot may be raked over and cuttings of the young shoots, 3 or 4 ins. long, taken off just underneath a joint, divested of their lower leaves, and inserted firmly 2 ins. deep. Or cuttings may be put 4 ins. apart in shallow boxes of sandy soil. They will make very little growth before spring, and it is not desirable that they should. They can be wintered on a shelf in a cool house from which frost is excluded.

A few of the old plants may be lifted in November, trimmed root and branch, tied in bundles, and hung in a cool cellar as a reserve. In spring the plants, young or old (but the former preferred), may be potted singly into 3-in. or 4-in., and stood in a frame or pit until the time comes for planting; or some of them may be potted-on for flowering in the greenhouse.

Winter Bloom. To get bloom in a heated house in winter, strike cuttings in spring, repot the plants as required until they are in 6-in., pinch once or twice to make them bushy, and pick out the flower buds as fast as they show until November, then let them come into bloom. Loam, with a little leafmould and some sand, makes a suitable compost. Zonal Geraniums are generally free from insects and diseases, but the foliage will become blotched if the falling petals are allowed to decay on the leaves.

The famous crimson variety Paul Crampel remains the most popular variety of Zonal Geranium, and so outstanding are its merits that many years may pass before it is superseded.

Gerbera, Barberton Daisy (gĕr-bĕr-a. Ord. Compositæ). The beautiful Gerbera Jamesoni arrested instant attention on its introduction from South Africa in 1889 with its large, starry, brilliant scarlet flowers, and being taken in hand promptly by hybridists, soon gave different colours. There is now quite a range of hues. The plant is not quite hardy, and if grown outdoors should have a sheltered place. It is perhaps best treated as a pot plant, being grown in a

frame or cool greenhouse. A sandy compost of loam and peat in equal parts suits it.

Propagation. Seed may be sown in pans of sandy soil in a warm frame or greenhouse in spring, the seedlings being pricked off, potted singly, and repotted as desired. 5-in. pots are large enough, and the soil may consist of loam with a third of leafmould and some sand. If growths from the base can be secured they may be used as cuttings. Although the plant likes plenty of water in summer, little is needed in winter. The flowers last well when cut.

German Catchfly. See Lychnis Viscaria.

German Flag. See Iris.

Germander. See Teucrium.

Germination. The start into growth of a seed. The conditions favourable to germination are dealt with under Seeds and Sowing, which see.

Gesnera (ges-nē-ra. Ord. Gesneraceæ). Very brilliant warm-house plants, with large, rough leaves and tubular flowers borne loosely on long stems. The flowers are both abundant and brilliant, so that the plants are very showy. They are suitable for pots or baskets. The tubers should be started in bottom heat in February, and potted in a compost of 3 parts loam, 1 part each leafmould and dried cow manure, and sand. They may be flowered in 6-in. pots. Give a warm house and plenty of moisture until they come into bloom, then a cooler house. Dry them off after flowering. Cardinalis, scarlet and white; maculata, purple, spotted; and refulgens, violet and white, are good species. The height is about 1 ft.

Geum, Avens (gē-um or jē-um. Ord. Rosaceæ). Brilliant orange-flowered hardy herbaceous plants, blooming in spring and early summer. Thriving in almost any soil, and flowering early and long, they are very useful. Chiloense (coccineum), scarlet, and its variety miniatum; and montanum, yellow, with its varieties, are most grown. The height in full bloom is about 2 ft. Several good varieties of Geum, notably Mrs. Bradshaw, crimson; and Lady Stratheden, yellow, are brilliant flowers for beds and border clumps. They come true from seed, which may be sown under cool conditions in summer to flower the following year, or in heat in winter to flower the same year. Ordinary soil. Boresi has the brilliant bright scarlet colour of Tropaeolum speciosum. Treat like Mrs. Bradshaw. Heldreichii, orange, 1½ ft., and its variety superbum; and Rossii, yellow, toothed foliage, are other good Geums.

Ghent Azaleas. See Azalea.

Gilia (jĭl-ia. Ord. Polemoniaceæ). The most popular members of this small genus are the hardy annuals tricolor, purple, white and black; and its variety alba, which grow about 1 ft. high and bloom in summer; but there is a much finer plant in the old species coronopifolia, which grows about 30 ins. high, and produces beautiful rosy flowers in summer. There are several forms of it. It is a biennial, but may be treated as a half-hardy annual, being sown under glass in gentle heat in winter and hardened for planting out in June. Californica, pink, 2 to 3 ft.; capitata, mauve, 18 ins.; and liniflora, white, 1 ft., are also good annuals.

Gillenia (gill-ē-nia. Ord. Rosaceæ). A small genus of hardy herbaceous plants, only one of which, trifoliata, is much grown. It produces red and white flowers in July, and grows 3 ft. high. Ordinary soil.

Gilliflower. The old name for Carnations, Wallflowers, and Stocks. It was spelt in various ways, including Gillyflower, Gilofré, and Gillivor. It probably originated from caryophyllus, the name of the Indian clove tree, Caryophyllus aromaticus, because of the clove scent.

Ginkgo, Maidenhair Tree (Gĭnk-go. Ord. Coniferæ). Ginkgo biloba (Salisburia adiantifolia) is one of the most distinct of Conifers, its foliage resembling that of the Maidenhair Fern. It does not grow rapidly, and may therefore be used as a lawn tree in small gardens. It thrives near towns, and will grow and succeed in any well-drained fertile soil. It may be planted in autumn or spring. There are several garden forms of it, such as laciniata, fastigiata, and pyramidalis.

Gladiolus (glăd-i-ōlus. Ord. Irideæ). The Gladiolus is the most beautiful of all the pseudo-bulbous plants, and one to which special attention should be devoted. Combining as it does beautiful form, graceful habit, and brilliant colours with a period of blooming which brings it between the summer and autumn flowers, it is almost indispensable. Height about 2 ft. in full bloom. Gladioli are not difficult plants to grow if the soil is well drained and free from wireworm, but they do not like stiff, damp soil, and on newly broken pasture-land they suffer severely from ground pests.

Soil. Well-drained loamy soil suits them best. It should be broken up deeply and a coat of decayed manure put under the top-spit. If this is done in winter, the surface may be left rough and dressed with soot or wood ashes to which superphosphate or bone flour at the rate of 3 oz. per square yard has been added. This should be dug well in. The corms may be planted 1 ft. apart and 3 ins. deep in April. The plants will need staking before they come into bloom.

Species and Varieties. Tristis concolor, a species with greenish-white flowers in late spring, 1 ft., is distinguished for its evening perfume. The small early-blooming varieties, like Blushing Bride (delicatissima), cardinalis, and Colvillei alba, are good for pots, and may be put in ordinary bulb compost in autumn and treated like other bulbs. For large garden Gladioli the flower gardener may buy mixed or named hybrids of gandavensis, Childsii, Lemoinei, and other types. He should also get the fine scarlet brenchleyensis, which is brilliant in colour, and is cheap. Like other Gladioli, it lasts well in water if cut while the spikes are young. Gladiolus lovers should look out for new varieties at shows, not overlooking the hybrids of primulinus and gandavensis, a modern race, the inner segment of whose flowers droops over so as to make them look like the Orchid Anguloa. The colours are shades of yellow. There are now many beautiful forms of primulinus.

After Flowering. It is well to take up the corms of garden plants in early winter, and store them in a dry, frost-proof place till spring; or they may be laid under a wall, covered with soil, and left till the shoots are 2 or 3 ins. high the following spring, then replanted. Spawn is likely to be produced abundantly, in addition to the new corms which generally form on the old; these can be taken off and treated as above.

Disease. Gladioli sometimes collapse through wilt disease of the

corms (Fusarium species). Destroy such corms and soak the rest in a 2 per cent solution of formalin before planting.

Glastonbury Thorn. See Crataegus.

Glaucium, Horned Poppy (glāu-cium. Ord. Papaveraceæ). A small genus of Poppies, the most familiar of which is luteum, the yellow horned Poppy; it bears large yellow flowers in summer. It may be raised from seed in spring, and does not require special soil. The variety of flavum called tricolor, orange with black centre, 1½ ft., a biennial, is good.

Gleditschia, Honey Locust (glē-dit-schia. Ord. Leguminosæ). The species triacanthos is a handsome deciduous tree growing 20 to 30 ft. high, distinguished by its graceful foliage. A drooping form of it called excelsa pendula may be mentioned. Delavayi is a modern species from Yunnan, with feathery foliage. Like the old species sinensis (horrida, ferox), it is distinguished by the strong spines on the branches and stems. The Gleditschias thrive in any good garden soil. Plant in autumn or spring.

Gleichenia (glēi-kē-nia. Ord. Filices). A small genus of ferns requiring a warm house. They form creeping rhizomes on the surface of the soil. Peat, with broken sandstone, forms a good compost. Propagation is by division in spring, or spores. Circinata, flabellata, and rupestris are the principal species. There are several varieties of each.

Globe Amaranth. See Gomphrena.

Globe Artichoke. See Artichoke.

Globe Flower. See Trollius.

Globe Thistle. See Echinops.

Globularia (glob-u-lā-ria. Ord. Selaginaceæ). The best-known species is cordifolia, a trailing sub-shrub forming dense tufts and producing blue flowers in summer. There is a white form of it. Nudicaulis, blue; tricosantha, blue; and vulgaris, blue, are also grown. They are suitable for the rockery. Propagation is by cuttings in summer or division early in autumn. Sandy loam suits.

Gloriosa (glori-ō-sa. Ord. Liliaceæ). Gloriosa superba is a brilliant hothouse twiner, with orange and yellow flowers which are curiously contorted. It should be repotted, when required, in January; but shifted only when the pots get very crowded. The opportunity should be taken of removing some of the offsets for fresh stock. It likes plenty of moisture in summer, but none in winter. Peat and loam in equal parts, with sand, suit. The variety grandiflora is good.

Glory of the Snow. See Chionodoxa.

Glory Pea. See Clianthus.

Gloxinia (glox-ĭn-ia. Ord. Gesneraceæ). The Gloxinia is one of the most beautiful of all tuberous-rooted plants, for it produces broad, handsome leaves, and abundance of large, bell-shaped flowers. It is very easy to grow, and therefore takes rank as one of the best greenhouse plants for amateurs. Heat is required in the early stages of growth, but when the plants come into bloom they are best in a cool house, where the flowers last well. The old type had drooping flowers, but the modern class has erect ones.

Propagation. Gloxinias may be raised from seed in winter in the same way as tuberous Begonias, which see, and good plants can be

flowered in less than 6 months. By using or withholding heat for different batches a succession of bloom can be had. Those who do not wish to raise plants from seed every year may store the tubers in winter like those of Begonias, and restart them in spring. Propagation may also be effected by leaves, either inserting the leaf-stalk in sandy soil, or nicking the midrib and laying it in the soil. Or the tubers may be divided in spring.

Compost. Loam, with a fourth each of leafmould and decayed manure and some sand, is suitable.

The species of Gloxinias are rarely grown in gardens nowadays, attention being devoted to the florists' varieties offered by seedsmen.

Glycine. See Wistaria.

Gnaphalium. The species often grown under the name of G. Leontopodium is the same plant as Leontopodium alpinum. See Edelweiss.

Goat's Beard. See Spiraea Aruncus.

Goat's Rue. See Galega.

Godetia (gō-dē-tia. Ord. Onagrarieæ). Beautiful hardy annuals, remarkable for their profusion of large, brilliant flowers and continuous blooming when sown outside in good garden soil in spring. Dwarf Pink, 1 ft.; Double Mauve, 2 ft.; Double Rose, 2 ft.; Double Crimson, 2 ft.; Schaminii flore pleno (double pink), 2 ft.; Lady Albemarle (carmine), 1 ft.; Lavender (lavender), 2 ft.; and Duchess of Albany (white), 1 ft., are good varieties. Lavender, with long sprays of beautiful flowers, is one of the best both for garden and cutting. It is well worth while to sow it in a pan, prick off the seedlings 3 ins. apart in shallow boxes, and plant out 1 ft. apart in good garden soil in May or June, thus ensuring bloom in July onward. For May bloom in pots, sow selected varieties in September. Botanists refer the genus Godetia to Oenothera, but the decision is not observed in gardens.

Golden Arbor Vitae. See Thuya.

Golden Bell. See Forsythia.

Golden Chain. See Laburnum.

Golden Drop. See Onosma.

Golden Feather. This once popular plant is the Chrysanthemum Parthenium aureum (formerly Pyrethrum parthenifolium aureum) of the botanists. Golden Feather is used for lines and designs in formal beds. It may be treated as an annual, being sown in a box in an unheated frame, and planted out in summer. The soil must not be made rich, or the plants will grow rank and green. They should be pinched regularly with finger and thumb to keep them dwarf.

Golden Heath. See Cassinia fulvida. Diplopappus chrysophyllus is the same thing.

Golden Larch. See Larch.

Golden Rain. See Laburnum.

Golden Rod. This graceful, late-blooming, hardy herbaceous perennial is the Solidago Virgaurea (sŏl-i-dā-go. Ord. Compositæ) of the botanists. It will thrive in almost any soil. There are several forms, but the common yellow serves when well grown. It is easily propagated by division. The flower-stems should be removed directly they fade, otherwise seed will fall and plants will come up all over the garden.

Golden Willow. See Willow and Salix.

Gold Fern. See Gymnogramme.

Goldilocks. See Chrysocoma (Aster) Linosyris.

Gold Thread. See Coptis trifoliata.

Gomphrena, Globe Amaranth (gom-phrē-na. Ord. Amarantaceæ). Pretty half-hardy annuals, well adapted for cool greenhouses in summer. The popular species is globosa, which has small roundish red flowers, like little crimson balls. There are several varieties, and in all of them the flowers are so persistent as to be suitable for use as "everlastings." They are easily raised from seed under a glass in spring, and are not particular as to soil.

Good King Henry or Mercury. See Chenopodium.

Goodyera (good-yē-ra. Ord. Orchidaceæ). Tuberous-rooted terrestrial Orchids, thriving in peat with a fourth of leafmould, and propagated by young shoots with a portion of tuber. They are grown for their brilliantly marked leaves. Discolor, pubescens, and velutina are the principal species. Pubescens is hardy; the others require a warm house.

Gooseberry (Ribes Grossularia. Ord. Saxifragæ). The Gooseberry is an old fruit, familiar in every countryside. It has been growing in British gardens as long as the "immemorial Elms." Unfortunately, familiarity has bred contempt in many cases, and the Gooseberry bush is left very much to itself. Such a course could have but one end in any fertile soil—a thick mass of interlacing shoots and small fruit difficult to gather. Being a really useful fruit, responding readily to a very simple course of culture, it ought to be treated better.

Propagation. Like the Currants, it is generally grown on its own roots, being struck, as they are, from cuttings in late summer, and shortened a year later to make it bushy. Like the red Currant, it is best on a clean stem. Spiny shoots springing up in a thicket from the roots are a nuisance to the grower, and should be avoided by picking the lower buds from the cuttings.

Pruning. It is a double advantage to keep the Gooseberry bushes well open when they get to the fruiting stage: larger berries are produced, and they can be gathered more quickly. The end can be gained by restricting the number of main branches to 7 or 8, and shortening the young side shoots in summer. The stumps can be pruned back close to the buds in winter. Gooseberries may be said to gush fruit. It exudes from almost every pore of healthy bushes. For this reason want of pruning will not cause sterility. All the old and a good deal of the young wood will bear. But taking one year with another, the grower will find it to his advantage to prune. In the early stages there should be the foundation work described in connection with the large fruits (see Fruit). Later the excision of crowding wood (with summer pruning if time can be found) will repay the time it takes. On the whole, red-Currant rather than black-Currant pruning suits Gooseberries. That is to say, there should be a good framework of ripe wood to yield the nucleus of the crop. Well-pruned Gooseberries will do at 7 ft. apart.

Enemies. The Gooseberry has many enemies, and small birds have to be taken into account, for they attack the dormant buds in winter, and often strip many bushes almost entirely. This is a

great nuisance, as the crop is reduced and the health of the bush impaired. In small cultures lime-spraying the bushes is good, or black thread may be twined among the shoots. It is doubtful whether either would pay in large cultures for market, but Gooseberries are often grown between big trees that are lime-sprayed, and benefit by the process. Red spider, a small mite, may attack Gooseberries, and do a great deal of damage, but it is rarely very bad except in dry, dusty places. A part of a plantation near a high-road may suffer and the inner portions be quite clean. More serious is the American Gooseberry mildew, which attacks the young growing shoots. In bad cases it spreads to the fruit, covering it with a mat of down and spoiling it. This enemy should be looked for in autumn, and if dark patches are seen on the young shoots they should be shortened by two-thirds, and the prunings burnt in order to destroy the winter spores, which otherwise could hibernate and germinate in spring. In April half a bushel of slaked lime may be spread over the surface of the soil as a further check on these spores. As a spring application to bushes showing the disease use ammonium polysulphide at the rate of 1 gallon to 50 gallons of water. Or lime-sulphur may be used at the strength recommended on the receptacle. The creamy, black-spotted caterpillar of the magpie moth may attack the foliage in early summer, and when present in force does great damage. The remedy is spraying with arsenate of lead, 1 lb. to 25 gallons of water, to within 6 weeks of picking. This remedy may also be used for the green, black-snouted caterpillar of the Gooseberry and Currant Sawfly.

Standards and Cordons. There is a certain demand for standard Gooseberries, which are not grown from cuttings, but are grafted on to stocks of Ribes aureum and allied species. They are suitable for private gardens, and when well grown yield splendid fruit. Gooseberries also give very fine berries when treated as cordons, that is, spur-pruned to a main stem and no side branches allowed. In such a form they can be grown against walls and fences.

Varieties. A few of the best of the Gooseberries for general use are Berry's Early Kent, Crown Bob, Whinham's Industry, and May Duke; while some of the best of the larger varieties are Whitesmith, Careless, Lancashire Lad, Antagonist, Leveller, Speedwell, and London. It is noteworthy that the best of the Gooseberries generally grown for eating raw, such as Pitmaston Greengage, Yellow Rough, Red Champagne, Bright Venus, Golden Drop, and Langley Gage, are comparatively small-fruited.

Soil. Gooseberries thrive on almost all soils, but like best a good loam over limestone. Crown Bob is perhaps the most adaptable, as it succeeds on shallow limestone soils as well as on clay. Its principal defect is a habit of turning its branches downwards, and unless this is corrected by pruning to top buds, the ground around the bushes will become in a few years a thicket of prickly undergrowth. The defect is shared by many other varieties, but is easily adjusted by pruning.

Gooseberry-Currant. A hybrid fruit resembling a Gooseberry in shape, and carrying small spines, but having the colour of the Black Currant. It is interesting, but not important.

Gordonia (gor-dō-nia. Ord. Ternströmiaceæ). Beautiful evergreens

resembling Camellias, but much rarer, probably owing to difficulties of propagation. Lasianthus, with large white fragrant flowers in summer, 8 to 10 ft. high; and pubescens, white with prominent golden stamens, 6 to 8 ft., are the two species grown. They are nominally hardy, but should have a sheltered place and well-drained soil composed mainly of peat and leafmould. Plant in spring.

Gorse. See Furze.

Gourd, Cucurbita (cū-cur-bī-ta. Ord. Cucurbitaceæ). A very large class, bearing fruits of different shapes and colours. They may all be grown as half-hardy annuals the same as Vegetable Marrows (which see), and for culinary use are generally grown in the open ground; but the ornamental varieties are suitable for growing against pillars and over arches. The following are a few of the most popular kinds:

Egg-shaped	Summer Crookneck
Hubbard Squash	Turk's Cap
Ohio Squash	Yokohama

Grafting. The process of grafting is an interesting and useful one. By its means a variety may be changed, a "stock" converted into a fruit tree, and a Brier into a Rose. Budding (see Budding) is a form of grafting which is done in summer, when the plants are in full growth. Outdoor grafting is best done in spring, when the sap is beginning to flow strongly. Indoor grafting, which is practised with Roses, Clematises, and other popular plants, is generally done in winter in a warm house.

Outdoor Grafting. This is generally limited to fruit trees. If a variety is unsatisfactory, a stronger one can be grafted on to it by taking a few shoots of the chosen variety while dormant in winter, and putting them in a cool, shady place, then, when the sap moves in the trees (an action which can be told by a slight change in the buds), the tops are shortened to stumps, and the grafts put in. Each scion should be a piece about the size of a Turkish cigarette, with 4 dormant buds. The lower inch is sliced down wedge-shaped, tapering to a point. Two opposite slits the length of the wedge-shaped slice are cut in the sides of the stumps to be dealt with, and the edges of the bark gently raised; the graft is slipped in and tied securely with raffia. To further the chances of union, paint all over the cut part some melted "composition wax" candle; or the following, melted together in a pot over the fire and brushed on while fluid: 6 parts resin, 2 parts beeswax or (cheaper) ordinary polishing wax, 1 part tallow. The mixture will exclude the air. Some grafters gain the same end by plastering a compound of cow manure, horse manure, and loam in a large cone round the graft. When the grafts begin to grow it is a good plan to tie flower sticks to the stumps and attach the grafts to the sticks, as a safeguard against their being blown out; but this is not necessary in sheltered places. They should be in active growth within a month. The above process is called "crown" grafting. In cleft grafting the stock is split across to receive the scions. Where young Paradise, Crab, Quince, or other stocks are being dealt with, a different system is necessary. As a rule nurserymen first bud such stocks, and the process is the same as budding

Roses. One bud is inserted in the stem of each stock a few inches above the ground. If it remains fresh the shoot grows the following spring; but should it fail, the top of the stock is taken off about 6 ins. from the ground and grafted. Here "tongue" grafting is performed. A slice is made upwards in the stock, and half-way along the cut face a cut is made downwards. The graft is also prepared with a slice and a cut and the two are fitted together, tied, and waxed.

Indoor Grafting. This is the work of expert propagators in nurseries, and is rarely done outside the trade establishments. The process adopted is generally called "saddle" grafting. The stock is cut upwards on two sides, forming a ridge, and the graft is slit up the centre so that it can be pressed gently on to the ridge or saddle and tied. Bottom heat is desirable.

See also remarks under Apples and Budding.

Grape Hyacinth. See Muscari.

GRAPE VINE

Vitis vinifera. Ord. Ampelideæ. This is one of the oldest fruits cultivated in British gardens. It was probably found in Egypt. In medieval times it was grown somewhat extensively in the open air, but cheap glass has enabled us to grow superior crops economically in houses, and wall space outside is now given to cordon fruit trees, or to beautiful climbers. The Grape Vine is an interesting fruit to grow from first to last, and is well within the scope of amateurs.

Propagation. The plants are grown on their own roots, like the majority of the soft fruits, and may be struck either from buds or cuttings while dormant in winter. A bud (technically termed an "eye") is a short piece of side growth with one plump bud on it, and several are placed 2 ins. apart in prepared soil in a large pot. The compost may consist of loam with a third of leafmould and a liberal sprinkling of sand. If it is kept moist, and the pots are plunged in a mild hotbed, the eyes soon start. But the rank and file of Grape growers would do well to leave this work to fruit dealers, who can raise better plants than amateurs.

Vineries. Grapes can be grown well in any light house, but a wide lean-to is more convenient than a span roof. Amateurs often get nice crops from small houses when they resist the temptation of crowding in all kinds of other plants. By planting the vines 4 ft. apart at the front of the house they have a clear run up the roof as far as the back wall. The vinery should be light and well provided with ventilators. It is not necessary that it be heated unless early Grapes are wanted, but it is advisable to have hot-water pipes in it, if only a flow and return 4-in. circuit. Wires should be strained under the roof 18 ins. from the glass.

Soil. An inside border, consisting of 3 ft. depth of old turves, with some broken bones and lime rubbish mixed in, will grow Grapes well. If the site is damp it should be drained, otherwise the roots will get into sour, water-logged soil, and the bunches will "shank"—that is, the footstalks of the berries will shrivel before the Grapes are ripe, and they will never colour, or develop proper flavour.

Planting. A good planting Vine bought from a nursery in autumn or winter will be from 6 to 10 ft. long, but the whole length should

not be retained. After the Vine has been planted the cane should be shortened, and the extent will depend on the height of the glass front; if the Vine is cut back to a point where the starting shoot will have full light directly the bud breaks into growth, it will be right. The roots should be covered lightly, and the soil trodden firmly but gently round them.

Pruning and Training. The first year the Vine may reach the top of the house, and while its progress may be regarded as satisfactory in one way, it would not be advisable to retain all the growth which it makes. On the contrary, the rod should be cut back to a third of its length in winter with the object of thickening the lower part. The growth that goes to the top the second year will be much stronger than the first, but if the cane has not thickened well it had better be shortened again by one-half. Any side shoots that push must be pruned close in to basal buds, which it is the habit of Grape Vines to form near the main rod, and from which the next year's lateral shoots push. Deliberation in thus developing the main rod will be rewarded in future years.

Fruiting. A few bunches of fruit may be taken the second year if the rod is strong, but there should not be anything like a crop until the third year, in which season, if all has gone well with the Vine, each lateral may be allowed to bear a bunch. These laterals should be chosen from the best shoots that push on each side of the rod about 1 ft. apart, and should be brought carefully down to the wires and tied at right angles with the rod. When the lateral has made two leaves beyond the bunch of fruit, the end should be pinched off, as unlimited extension is undesirable. When the fruit has been gathered each lateral may be cut back to half its length, and further pruned back—this time to the basal bud near the rod—in autumn.

Moisture and Ventilation. Air and water are important considerations from the very first. The Grape Vine loves fresh, pure, but not dry, air. A well-managed vinery is a pleasant place to enter, because the air is what gardeners well call " buoyant "; it is light, fresh, and sparkling. The condition is secured by providing plenty of ventilation, keeping the soil moist, and syringing regularly from the time growth starts. Let not the grower be caught napping with his ventilation. If the sun breaks out on a house which is quite closed while he is still abed, there may be scorching of leaf and scalding of berry. These troubles are the most likely to happen after a damp spell.

Temperatures. Artificial heat becomes important in proportion to the amount of forcing which is to be done. If Grapes are wanted in April, enough piping must be provided to maintain a temperature of 50° to 60° in November by artificial means, and 65° to 75° when the Vines come into bloom; this, be it understood, without sun heat. It means, of course, forcing all through the winter. If Grapes are not wanted before July or August, things are simplified, as the house need not be started before the end of February, and increasing sun-heat will help the forcing in spring. It should be noted that the delicious white grape Muscat of Alexandria needs more heat than the hardier Foster's Seedling and Buckland Sweetwater, or the popular Black Hamburgh and Black Alicante. The air should be kept fairly dry while the Vines are in bloom, in order to favour the

spread of the pollen. If the weather is wet and dull at that period, rendering it difficult to get a pleasant flow of buoyant air, it will be well to assist fertilisation by shaking the rods. When the Vines go to rest in autumn reduce fire heat to a minimum; as long as severe frost is kept out of the house they will be safe.

Thinning. A tedious but necessary task. Without it the bunches become shapeless masses of berries large and small, which ripen irregularly, some not at all. The beginner should call on a neighbouring professional, and ask permission to watch his work.

Troubles. The real troubles begin when shanking, scalding, scorching, mealy bug, and red spider attack the Vines. If shanking (shrivelling of stalk of berry) is persistent in young Vines, overcropping may be suspected, and the difficulty tackled by taking fewer large bunches and giving liquid manure while the crop is developing. If the trouble is in old vines, the roots should be examined; deep-striking ones may be severed, and others raised into fresh soil near the surface. The remedy for scalding (young berries discoloured) and scorching (shrivelling of green leaves) is proper ventilation, see above. Mealy bug is a serious pest, as when it once gets well established it is difficult to dislodge, and may spread to the bunches. An infested house should be thoroughly cleaned in winter, the woodwork being well scrubbed with a solution containing paraffin oil, and the Vines freed of loose bark and scrubbed with an insecticide. Vigorous syringing will help to keep the enemy under. Red spider will not gain a footing if the house is kept moist. Syringing is the best remedy. Mildew is due to faulty ventilation. Wasps sometimes prove destructive, and must be kept out of the house by covering the ventilators with muslin and keeping the door shut.

Varieties. The two most useful all-round varieties for indoor culture are Black Hamburgh and Foster's Seedling. They are vigorous, relatively hardy, productive, and of good flavour. Muscat of Alexandria is superior in flavour, but requires more heat. Gros Maroc is a large Grape of fair flavour. For late use, Alicante is the most useful. Other well-known sorts are Alnwick Seedling and Lady Downe's Seedling. Gros Colman is very large, but the flavour is not remarkable, while it is bad to colour. If Grapes are wanted for outdoor culture, Ascot Citronelle and Miller's Burgundy may be chosen.

To Keep Grapes. Grapes can be kept fresh and sweet for a long time if the bunches are cut with a piece of lateral, and this is fixed in a bottle of water. The store should be cool, dry, and airy.

Grapes in Mixed Greenhouses. It is hardly feasible to grow good Grapes in a general greenhouse unless the plants are restricted to kinds which do not want much heat in winter and can endure shade in summer. If a house is kept warm for plants in winter it starts the Vines too early. It is best to work on plants which spend the summer outdoors and need little heat in winter. The Chrysanthemum is a notable instance.

GRASS FOR LAWNS AND GAMES

Whether for paths, tennis lawns, flower gardens, or shrubbery borders, grass is a most important consideration. Simple as it is, it will be found to need special and skilled attention if it is to be kept

in good order and of smart appearance. There is an impression that because grass grows in every pasture it needs no management. Well, the field would soon lose its beauty if it were not manured and grazed.

Turf. A person who is making a garden out of a pasture will be disposed to work on the plan of cutting up only as much turf as is required for beds, borders, and shrubberies, leaving the rest for lawns. That is all right provided (1) the grass has been well managed by the farmer, and is not full of plantain, dock, thistle, buttercup, and daisy; (2) the gardener is prepared to mow, roll, and clip the edges regularly. Clean field turf can be made into good garden turf by mowing it weekly from April to October while dry, rolling it when wet, spudding out weeds or dressing them with sulphuric acid (which must be kept off grass and clothing), trimming the edges of the paths with a pair of long-handled edging-shears, and every two or three years spreading on a mixture of fine soil and dry, crumbly manure 1 in. thick in autumn, letting it lie till spring, and then sprinkling on the following mixture per square rod: 1 lb. nitrate of soda, 4 lb. bone meal. Tennis and croquet lawns are playable from turf the same season, but not from seed. There ought to be a good, thick springy mat of turf before tennis begins; otherwise the ground is soon worn bare. It is desirable to get a perfectly firm piece of ground for turf at all times, and particularly so for tennis, otherwise it will soon fall into hollows. A full-sized tennis lawn is 78 ft. long and 36 ft. wide, but it is well to allow extra space when making a lawn for this purpose.

Bowling Greens. Cumberland turf, which consists mainly of Red Fescue, is favoured for bowling greens. It is nominally entirely free from weeds, but will degenerate if neglected. No clover seed should be sown, nor should basic slag be applied, as it encourages clover.

Golf Greens. Dog Bent Grass (Agrostis canina) is favoured for golf greens.

Seed. In forming grass it is best to use seed unless one is absolutely sure of being able to get turves free from weeds; given the latter, however, turves are to be preferred, as by laying them evenly and closely on a firm bed of soil in winter and beating them thoroughly, a lawn fit for anything can be had in a few weeks. It must be remembered that seeding does not necessarily give a weed-free lawn, and the gardener must shun cheap seed from obscure sources, because it is likely to contain as many weeds as grass seeds. Buy from one of the large firms that specialise grass seeds, even if the price is rather high, because these dealers select and clean their seeds with great care. The soil must be well prepared. It is a good thing to do the work in September, digging, manuring, crumbling, and treading the soil, thus making it quite fine, and sowing a pound of seed to the square rod. A little clover may be added, provided the grass is not wanted for games, otherwise omit clover. Cover lightly with fine, sifted soil, and put black threads or some other protection over it to keep off birds. If the work cannot be done in September do it in April. The lawn is likely to be good or bad according to the thoroughness with which the soil is prepared.

Grass Seed Mixtures. A good general mixture for tennis and other lawns and cricket pitches may be composed of the following Grasses:

Kind	*Parts by weight*
Sheep's Fescue	25
Hard Fescue	20
Fine-leaved Sheep's Fescue	15
Dogstail	15
Smooth-stalked Meadow Grass	15
Rough-stalked Meadow Grass	10
	100

A good general mixture for playing-fields, cricket outfields:

Kind	*Parts by weight*
Short-seeded Perennial Rye Grass	50
Hard Fescue	25
Crested Dogstail	10
Smooth-stalked Meadow Grass	5
Rough-stalked Meadow Grass	5
Fiorin	5
	100

If Clover is wanted not more than 2 lb. of white Clover should be added per acre.

Lawn Sand. A mixture of 12 to 15 parts by weight fine sand, 1½ parts sulphate of ammonia, and ¾ part sulphate of iron, forming commercial "lawn sand," is excellent for dressing weed patches. The broad leaves of the weeds retain it and are scorched, but the finer leaves of the grasses do not, and therefore escape injury.

Mossy Lawns. Moss is commonly due to soil acidity. Scratch well with a large rake and apply a dressing of soil containing one-sixth of slaked lime (see Lime) between October and March.

Excess of Clover. This is a common trouble after a wet summer. To reduce it, after rain, but with expectancy of sun, water in the morning with a solution of nitrate of soda or sulphate of ammonia, 14 lb. to 8 gallons of water. Leave all day. Next day give a soaking with plain water. This burns off the Clover.

Worm-casts. If present in excess, dress the grass with an approved worm-killer obtainable from a seedsman, using ½ lb. per square yard during mild showery weather in September or October. Do not roll the grass for a few days before applying the dressing.

Grasses, Ornamental. The principal Grasses grown in flower gardens are named under Annuals (which see) and also separately in alphabetical order throughout the book. See Agrostis, Briza, etc.

Gravel. See Walks.

Greek Valerian. See Polemonium caeruleum.

Green Fly. One of the most troublesome of plant enemies. For remarks, see Aphides.

Greengage. For the cultivation of this delicious fruit see Plums.

GREENHOUSES: HEATED AND UNHEATED

With the aid of a greenhouse, heated or unheated, many plants may be grown which have to be omitted where there is no glass,

and flowers can be produced at periods of the year when they would have to be procured by purchase, or done without, if there was no plant structure available. Greenhouses, therefore, are a useful auxiliary to the garden. At the same time, they entail additional expense and responsibility, and these things should be considered. Greenhouses are of many shapes and sizes, and they are devoted to various purposes; but in large establishments, where there are several different glass structures, "greenhouse" has a specific meaning. It is not a "stove," an "intermediate house," a "pit," or a "conservatory"; it is "the greenhouse"—a mildly heated house, used mainly for bringing on young plants which are to be flowered in a conservatory. With amateurs of limited means, however, the greenhouse is a general structure, in which all kinds of plants are grown, and which is used for flowering mature plants as well as bringing on young ones.

Forms of Greenhouses. A greenhouse may have a single roof, leaning against a wall or other support; or it may have a "span" roof, each side supporting the other against a ridge-board. Against a low wall it may rise, make a short dip, and rise again to the wall, forming a "hip." A plain span or lean-to is better than a compound structure for amateurs.

Materials. The greenhouse should consist of well-seasoned timber, painted 4 coats, and glazed with 21-oz. glass without putty. It should be well supplied with ventilators. In a span-roof there should be at least one ventilator on each side. If the structure is to be movable, it should be made in sections to rest on loose bricks, and fixed to the wall with screws turned into blocks. In the case of a freehold owner, the house may rest on mortared brick walls. The ends should be north and south.

Urban Building Laws. In districts where urban building laws apply, a person may not erect a greenhouse of any kind before submitting plans to the corporation, district council, or other authority.

Plants for Unheated Greenhouses. It will not be possible to get bloom all the year round from an unheated house by growing the ordinary pot plants, but by using bulbs and some garden plants as well there will generally be flowers. The following are available, and the plants named are dealt with under their own names throughout the book:

Plants raised from Seed

Various half-hardy annuals (see Annuals)
Auriculas, also from offsets
Carnations, Margaret and Grenadin
Primroses and Polyanthuses
Sweet Peas
Various Alpine plants (see Alpines, Flower Gardens, and Rockery)

Plants from Bulbs, Tubers, or Offsets

Arum Lilies
Cannas
Daffodils
Freesias
Gladioli
Hyacinths
Irises
Liliums
Tulips

Plants from Cuttings

Azaleas	Geraniums, Zonal
Camellias	Roses, also from buds
Chrysanthemums	Violets, also by divisions and runners

Plants propagated by Division

Christmas Roses	Dielytra spectabilis
Deutzia gracilis	Hoteia japonica

The Auriculas, Primroses, Polyanthuses, Alpine plants, Arum Lilies, various early bulbs, and Violets, will bloom in mild spells during the winter, or in early spring. The bulk of the bulbs will flower in spring, followed or accompanied by the Azaleas and Camellias. The Carnations, various annuals, Deutzia, Dielytra, Hoteia, Sweet Peas, Cannas, Gladioli, Liliums, and Roses, will bloom in summer. The Chrysanthemums, Zonal Geraniums, and Christmas Roses will bloom in autumn and early winter.

Cool Greenhouses. A "cool" greenhouse is one in which the temperature ranges from 45° to 50° in winter, not falling below the former figure even in very cold weather. The following plants may be grown in it:

Plants from Seeds

Abutilon	Gerberas
Acroclinium	Gloxinias
Alonsoa	Grevillea robusta
Balsam	Humea elegans
Begonia	Mignonette
Calceolaria, herbaceous	Musk
Campanula pyramidalis	Petunias
Carnations	Rhodanthe
Celosias	Schizanthuses
Cinerarias	Streptocarpuses
Coleuses	Sweet Peas
Cyclamen	Verbenas
Diascia	Zinnias
Francoas	

Plants raised from Cuttings

Acacias	Hydrangeas
Chrysanthemums	Oleanders
Coleuses	Pelargoniums
Cytisus	Plumbago
Fuchsias	Salvias
Geraniums, Zonal	Solanums

Plants from Bulbs or Offsets

Arum Lilies	Gladioli
Clivias	Hyacinths
Daffodils	Liliums
Freesias	Tulips

Plants propagated by Budding or Grafting

Lilac	Rose

It will be seen that a good many of the kinds recommended for the unheated house are also available for the cool structure; in the latter they may be expected to flower earlier.

Warm Greenhouses. Some of the preceding kinds can be forced into earlier bloom in a warm house, and the structure will also be useful for raising seedlings for the flower and kitchen gardens. In a house in which a minimum winter temperature of 60° can be maintained the following plants may be grown:

Achimenes	Gardenias
Allamandas	Gesneras
Amaryllises	Hoyas
Anthuriums	Impatiens
Begonias	Ixoras
Bougainvilleas	Jacobinias
Bouvardias	Jasmines
Caladiums	Justicias
Carnations	Lapagerias
Clerodendrons	Lily of the Valley
Cockscombs	Nepenthes
Crotons	Poinsettias
Dipladenias	Stephanotis
Eucharises	Thunbergias
Exacum	Torenias

Aspect. Span-roof houses should run north and south. Lean-to houses should face south, or as near it as possible.

Heating. This must have careful consideration. In large houses it is only a question of which particular fire-boiler should be used, but with smaller structures the claims of oil and gas may be considered. The smaller a fire-boiler is, the more difficult is the task of keeping it alight for 9 or 10 consecutive hours. On this account oil heaters may be chosen for very small houses. The types in which a lamp and boiler can be fixed outside the house, and connected with a set of pipes within, are safest. A slight smell of petroleum is not injurious to plants, but thick fumes are deadly, and everyone knows how ready a flame is to "run up" spontaneously. Whenever an oil stove is set inside a house, a wide wick, rubbed clean daily, should be used, together with the best quality of oil. The light should be kept low when first lit, and watched till the danger-point of running up is past. For small-medium houses an upright boiler set in the wall of the house, and connected with a flow and return 4-in. pipe along two sides and one end, may be used. The pipes may be jointed with indiarubber rings and end in an expansion cistern. They should rise slightly from the boiler. For large ranges of houses a horizontal boiler, such as a Saddle, may be used. The setting and fitting of the pipes should be a matter of contract in buying the heating apparatus. Anthracite coal, or coke, may be used as fuel, with a little breeze and refuse house cinders for upright ones.

Stoking. This is important, but can be learned by practice and observation. The fire should have a bright bottom, and the bars should be clear, last thing at night. The fire may be topped with some small damp fuel. In a flat-boiler furnace the glowing embers

should be drawn to the front, and the fresh fuel thrown well back. The ashes should be cleared away daily and the flues cleaned once a month. The use of the damper should also be studied.

Staging. The most durable flat stage, and the best for the plants, is one consisting of large slates resting on a strong wooden framework and surfaced with white shell or fine shingle. This can be kept moist in hot weather.

Shading. Shade is essential to some plants when grown under glass, notably Ferns, Cucumbers, and many Orchids; and it may be said to be beneficial for all in hot weather, while it lessens labour by reducing the necessity for watering. Movable shading in the form of tiffany or scrim blinds mounted on rollers which can be drawn up under a cover at the top of the house in dull or wet weather is the ideal. The larger seedsmen and nurserymen supply tiffany and scrim, and the latter makes admirable blinds. A cheap form of shading is to paint the glass with one of the special preparations sold by seedsmen. This must, of course, remain on in dull as well as in bright weather. It should be removed in autumn.

Green Manure. See Manures.

Grevillea (Gre-vill-ea. Ord. Proteaceæ). Grevillea robusta is a graceful plant, grown for the sake of its slender branches and elegantly cut foliage. It is suitable for mixing with other plants in a greenhouse, and may be used for rooms. With care in watering (see Watering) and ventilating, a room plant may be kept healthy for a long time. It is not quite hardy, and should be withdrawn from a window in cold weather and protected with a newspaper. Plants may be raised from seed sown in soil in a frame or greenhouse in spring, pricked off, potted singly, and repotted. 6-in. is a good size for the final pot. Loam and peat in equal parts, with a good deal of sand, make a suitable compost.

Griselinia (gris-el-in-ia. Ord. Cornaceæ). The most important species is littoralis, an evergreen shrub with leathery leaves, 10 to 15 ft. high, in sheltered places, and in fertile soil near the sea. Lucida, so called owing to its shining leaves, grows about 10 ft. high. Its variety macrophylla has longer leaves. Propagation is by layers in late summer. Plant in spring.

Gromwell. See Lithospermum.

Ground Ivy. See Nepeta Glechoma.

Ground Nut. See Apios tuberosa.

Guano. An excellent nitrogenous fertiliser. In addition to the coarse imported product, called Peruvian, there are refined forms, such as Canary. It may be used with special advantage to green vegetables and Onions at the rate of 2 oz. per square yard. A thin coat spread over the soil of well-rooted pot plants and watered in is good. A useful liquid manure may be made by mixing $\frac{1}{2}$ oz. in 1 gallon of water. Fish guano, the dried refuse from fish factories, is slightly inferior to refined Peruvian, and another ounce per square yard may be used.

Guelder Rose. See Viburnum.

Guernsey Lily (Nerine sarniensis). See Amaryllis and Nerine.

Gum, Blue. See Eucalyptus.

Gum Cistus. See Cistus ladaniferus.

Gumming. Stone fruits, such as Peaches, Plums, and Cherries, are

liable to exude gum, particularly after hard pruning while the trees are leafless. Summer pruning is preferable. The branches should not be allowed to grow across each other and rub. Over-luxuriance should be checked by root pruning. See the fruits named.

Gunnera (gŭnn-era. Ord. Haloragеæ). Gunnera scabra (chilensis) is a hardy herbaceous perennial, with large, spreading, hairy leaves. A healthy plant makes a fine object by the waterside. It likes plenty of peat and leafmould, with a covering of litter in winter. Propagation is by division in spring. Manicata is also a fine species, with very large leaves.

Gymnocladus, Kentucky Coffee Tree (gym-no-clā-dus. Ord. Leguminosæ). The best-known species is canadensis, a handsome deciduous tree with feathery leaves and white terminal flowers followed by oblong pods, which, however, do not generally mature in Great Britain, height 30 ft. in good loamy soil. Propagation is by root cuttings in bottom heat in spring. Plant in autumn or spring.

Gymnogramme, Gold Fern, Silver Fern (gў̆m-no-grăm-mĕ. Ord. Filices). These are among the most beautiful ferns for pots and hanging baskets. Basket culture permits of the charming colours being clearly seen. Loam, peat, and leafmould in about equal parts, with sand, suit. Propagation is by spores in heat (see Ferns). They need a good deal of water, with shade from hot sun in summer. Calomelanos chrysophylla, yellow; and schizophylla, silvery, are the principal kinds. There are several beautiful forms of both. Elegantissima, pulchella, and the crested variety of the latter called Wettenhalliana are also good.

Gymnosperms. Plants the ovules of which are produced externally on the leaf-like scales of the young fruit. See also Angiosperms.

Gynaecium. The collective female organs of a flower. See also Andraecium.

Gynerium, Pampas Grass (jy-nē-rium. Ord. Gramineæ). Gynerium argenteum is the noblest of Grasses, throwing up long silky white plumes in late summer, which remain beautiful many weeks. Before frost touches them a few may be cut for house decoration. The Pampas Grass makes a splendid bed on the outskirts of a lawn if the position is sheltered and the soil well drained. It is a hardy perennial, and may be planted in autumn or spring. Propagation is by seed, sown under glass in spring.

Gypsophila, Chalk Plant (jў̆p-sŏph-i-la. Ord. Caryophylleæ). Graceful plants, one species of which, paniculata, is a hardy perennial that spreads into a broad bush and bears numerous sprays of lace-like bloom; it is good for mixing with cut flowers. It may be raised from seed in spring, and thrives in most soils, particularly liking chalk. There is a double variety, which is best propagated by inserting pieces of root 3 ins. long and as thick as a lead pencil in pots of sandy soil in a cold frame, the tip level with the surface of the soil. Seed may also be used if obtainable. G. Ehrlei is double white. G. elegans is good as an annual; sow outside in spring. G. repens (prostrata) is a creeping white-flowered perennial suitable for the rockery; rosea is a rose form of it; Steveni, white, is a perennial.

Gypsum (Sulphate of lime). A useful fertiliser for fixing ammonia. For this reason it may be used with advantage over a manure heap, spread in a thin coat.

H

Habenaria (hăb-en-ā-ria. Ord. Orchidaceæ). A genus of Orchids, the most popular species of which are hardy, and thrive in sandy peat in the rock garden. Among these may be mentioned bifolia, the Butterfly Orchis, which grows about 1 ft. high and produces white flowers in early summer; fimbriata, lilac; and the modern Japanese species radiata, fringed white flowers. Propagation is by division, the pieces being potted and started in a frame.

Haberlea (hā-ber-lēa. Ord. Gesneraceæ). Herbaceous perennials, the most popular of which is rhodopensis, a plant esteemed for a shady part of the rockery, where it thrives in peaty soil if given a little protection in winter. It may be propagated by seeds or division in spring. It bears its lilac flowers in spring on stems a few inches high. Virginalis, white, is also good.

Habrothamnus. See Cestrum.

Hacquetia. See Dondia.

Haemanthus (he-măn-thus. Ord. Amaryllideæ). Warm-house bulbs, thriving in sandy loam with a third of peat, propagated by offsets, and easily managed if given plenty of water in summer and kept dry in winter. A little of the top soil should be removed every spring and fresh substituted. The flowers are brilliant. Cinnabarinus, red, spring; coccineus, scarlet, late summer; and multiflorus (Kalbreyeri), scarlet, spring, all 1 ft. high, are the best.

Ha-ha. A sunk fence; thus, a fence in a wide ditch is a ha-ha. It prevents the irruption of stock while not impeding the view.

Hailshamberry. This has been described as a hybrid, and may be so, but it resembles, and serves the purpose of, a good autumn-fruiting Raspberry. See Raspberry.

Halesia, Snowdrop Tree (hāles-ia. Ord. Styraceæ). The species tetraptera is a beautiful small deciduous tree, growing up to 10 ft. high, and bearing charming white, drooping, Snowdrop-like flowers in July. It likes a sheltered position in the shrubbery and a light, loamy, well-drained soil. Propagation is by root cuttings in a frame in spring, or by seeds. Very little pruning is required, but the bush should be kept shapely. The species hispida, less important, is the same as Pterostyrax hispidum. Plant in spring.

Halimodendron (hal-i-mo-den-dron. Ord. Leguminosæ). The species argenteum, the Salt Tree, so called on account of its maritime habitat and grey feathery leaves, is a hardy deciduous shrub, growing 4–6 ft. high, with pink flowers in early summer. It is sometimes grafted on to a standard Laburnum, and planted on the lawn, where it makes an attractive object. It likes sandy soil, but is not fastidious. Plant in spring.

Hamamelis, Witch Hazel (hăma-mē-lis. Ord. Hamamelideæ). These small deciduous trees are valuable because they flower early in the year, and will thrive in town gardens. They enjoy a good loamy

soil. Propagation is by cuttings and layers in autumn. Mollis is the best; it is covered with yellow flowers at mid-winter, when bare of leaves, and is pleasantly scented; height up to 8 ft. Arborea (japonica) has brown and yellow flowers; Zuccariniana, brown and yellow; and virginica, yellow, may also be mentioned.

Handglass or Handlight. A small glass case, sometimes made with a light, movable top, very useful for protecting half-hardy plants, which have been raised in heat, subsequently to hardening in a cold frame. It is also useful for covering cuttings which have to be kept close until rooted.

Hardy Perennials. See Herbaceous Plants.

Harebell or Hairbell (Scotch). See Campanula rotundifolia.

Hare's-foot Fern. See Davallia canariensis.

Hare's-tail Grass. See Annuals and Lagurus ovatus.

Haricot. The ripe seeds of Kidney Beans. Most of the popular varieties rarely mature in Great Britain, but special dwarf varieties are obtainable which do, while white-seeded Runners may also be left to mature.

Harpalium (har-pā-lium. Ord. Compositæ). Hardy herbaceous perennials with showy yellow flowers, propagated by division in spring. Rigidum, the only species grown, is now called Helianthus rigidus by botanists.

Hart's-tongue Fern. See Scolopendrium.

Hautbois. A small Strawberry. See Strawberries.

Hawkweed. See Hieracium.

Hawthorn. See Crataegus.

Hawthorn, Winter. See Aponogeton.

Hazel. The Hazel is Corylus Avellana, and as a fruit is dealt with under Nut, which see. It should be remembered, however, that the purple-leaved form makes a useful ornamental shrub, especially when cut down every third year, for then it throws up magnificent purple foliage and becomes a valuable foil to brighter things in the shrubbery. Ordinary soil. Plant in autumn or spring. See also Corylus.

Hazel, Witch. See Hamamelis.

Heartsease. See Pansy.

Heath. See Erica.

Heather. See Calluna.

Heating. See Greenhouses.

Hebenstreitia (hēben-streit-ia. Ord. Selaginaceæ). The species comosa, offered by seedsmen, with pretty spikes of white, orange-spotted flowers, height 1 ft., is worth growing, sowing outside in ordinary soil late in April, and thinning as needed.

Hedera, Ivy (hĕd-ĕra. Ord. Araliaceæ). Many people would not recognise the " Ivy Green " under the name of Hedera helix, but it is well to keep the botanical name in mind, because nurserymen often offer special forms of Ivy as Hederas.

Species and Varieties. The common green Ivy is rarely planted on houses nowadays, as the variegated sorts are more attractive. But the common Ivy is useful for making a screen, covering a bank, or planting against an outhouse. That and the Irish (canariensis) are two of the fastest growers. One of the largest-leaved Ivies is dentata, and there is a handsome form of this called variegata, the

dull green leaves of which have a yellow edge. Another handsome form is maderensis variegata, green with a broad white edge. Marginata aurea, marmorata, Raegneriana, and rhombea are also handsome forms. Those who want a screen as quickly as possible should buy strong plants of the Irish Ivy on stakes in pots. Each plant will have several shoots, which may be spread out and tied in position.

Planting and Propagation. The Ivies may be planted in autumn or spring, and will thrive on most kinds of soil, though if planted late on poor chalky soil they are slow in making a start. They are propagated by cuttings in a cold frame in autumn, and in the nurseries by grafting. Clipping should be done just before new growth starts in spring.

The tree Ivy, arborescens, has many forms, which may be grown in shady spots and need no support.

Hedges. A good hedge serves the double purpose of a fence and a shelter; consequently, many who are enclosing ground for a garden turn their thoughts to a living dividing line. It must be remembered, however, that several years are required to make a good hedge, the time varying with the kind, the soil, and the climate. With rich soil and a moist climate it is possible to get a good Privet hedge in 4–5 years; with poor soil and a dry climate 8–10 are required. In any case a hedge enclosure is of no service as an immediate guard against sheep and cattle, and a wooden or wire fence is needed in addition (see Fences). It is a good plan to plant a hedge within an open fence, for the sake of the shelter which it provides. It should not be made too close to the fence to be pruned properly. If the fence is an open one of wire, 4 ft. must be left, or cattle will eat it down. At that distance, and with wire netting at the lower part to keep out lambs, it will be safe.

Quick. Whitethorn (Quick) is the best of the cheaper non-evergreen hedge plants. It should be planted 9 ins. apart all ways in a double row, thus ⋮ ⋮ ⋮ ⋮ ⋮ each three plants forming a triangle. The soil should be manured beforehand, and the Quick should be shortened to about 9 ins. high, in order to make it break freely at the base. If pruned annually it will grow bushy and in due course make an impenetrable barrier to stock, which will keep clear of it. When in bloom in May it will be attractive.

Privet. The oval-leaved Privet is a good evergreen hedge plant, and may be treated in the same way as Quick, except that a single row suffices if the plants have been well shortened in the nursery; but it must be well protected while young, or sheep will eat it down. Although the oval-leaved is nominally evergreen, the leaves may fall in a severe winter. It should be clipped twice annually, in June and September. A drawback to Privet in the estimation of many is the odour of the flowers, which they find disagreeable, and even injurious.

Various Hedge Plants. Myrobalan Plum makes a good, inexpensive hedge. For inner hedges Yew (which is poisonous to animals), Sweetbrier (see Brier), Hornbeam, Beech, Laurel, Box, and Holly may be mentioned. Yew hedges are very appropriate for formal gardens, and may be clipped into shape as desired, but they grow

slowly. Hornbeam and Beech are deciduous, but through their habit of holding their leaves in a dry state for the greater part of the winter give good shelter. Beech will be the better for chalk, although it grows slowly for a few years after planting, and Hornbeam for clay. Laurel and Holly are splendid for hedges where there is plenty of room, but need careful pruning, or they become unsightly. Among newer evergreen plants there is nothing to beat Lonicera nitida, which is hardy except in very exposed places, and makes a dense shining mass of leafage. It is much dearer than the others. Plant 18 ins. apart. Arbor Vitae makes a good hedge on fertile soil; like Yew, it should be kept for use as an inner hedge, because animals are sometimes injured by eating it, although not in all districts. The soil seems to make a difference.

Hedgehog Holly. See Holly.

Hedgehog Thistle. See Cactus (Echinocactus).

Hedge Mustard. See Erysimum.

Hedysarum, French Honeysuckle (hē-dĭs-ar-um. Ord. Leguminosæ). The species coronarium, red, and its white variety, growing 3 to 4 ft. high, are hardy herbaceous plants easily raised from seed sown outside in spring. Multijugum, however, is a deciduous shrub, with purplish-red flowers, height 4 to 5 ft. Ordinary soil.

Heeling-in. A gardener's term for the practice of laying the roots of fruit and other trees which have been received from a nursery in a shallow trench, and covering them with soil pending a suitable time for planting them.

Helenium (hē-lē-nium. Ord. Compositæ). Hardy herbaceous perennials, with showy flowers in late summer. Autumnale, yellow, summer, 3–5 ft., is the principal species, and has many varieties, of which pumilum is the most popular; it has yellow flowers on stems about 1 ft. high; in the variety striatum the flowers are striped with red; grandiflorum has large flowers; height, 4 ft. Riverton Gem, crimson and yellow, is very fine. Heleniums thrive in any good garden soil. Propagation is by division in winter or spring, and by seeds.

Helianthemum, Sun Rose (hĕlĭăn-themum. Ord. Cistineæ). Brilliant plants for the rock garden, where they will thrive in light, sandy soil in sunny spots, and make a bright display in early summer. They may be raised from seed or propagated by cuttings in a frame. The common species is vulgare, a yellow-flowered trailer, but many flower lovers prefer to select a few good named forms for their rockeries. There are many colours to choose from.

Helianthus, Sunflower (hēlian-thus. Ord. Compositæ). The Sunflowers, annual and perennial, are among the most popular of hardy herbaceous plants, and should always be planted in large borders to give a display when most of the summer flowers are over. The species vary a great deal in height, some being no more than 3 or 4 ft., while others rise to 8 or 10 ft. They make their finest growth in a moist, fertile soil. The perennials are easily propagated by division from autumn to spring, and the annuals by seed sown outside in spring. Of the annuals, cucumerifolius, New Miniature, Munstead Primrose, and Stella are good. The modern annual parti-coloured forms, yellow with zones of bronze and brown, are increasingly popular. Multiflorus maximus is a fine single perennial form, and

flore pleno a splendid double. All the foregoing grow about 4 ft. high. Rigidus Miss Mellish is also a good plant.

Helichrysum, Everlasting (hĕl-i-krīs-um. Ord. Compositæ). These are the most beautiful and popular of "Everlastings," the flowers of good strains being large and of beautiful colours, which are retained throughout the winter if the flowers are gathered early and hung head downward in bunches in a cool, dry place. Sow seed in a box in February, prick out 4 ins. apart in other boxes, and plant out in May, 18 ins. apart. The seedsman's Helichrysums have come from the species bracteatum. There are dwarf (nanum, 1½ ft.) and tall (monstrosum, 2½ ft.) types, each obtainable in separate colours as well as mixtures. Arenarium, 1 ft., has yellow flowers. Bellidioides (Daisy-like) has white flowers. See also Everlastings.

Heliopsis (hē-li-ŏp-sis. Ord. Compositæ). The best-known species is scabra, a hardy herbaceous perennial with yellow flowers, height 3 ft.; imbricata, Pitcheriana, gratissima, major and zinniaeflora are varieties of it. Ordinary border soil. Propagation by division in spring.

Heliotrope, Heliotropium (hĕl-iotrō-pium. Ord. Boragineæ). One of the most richly perfumed of all flowers, and if not brilliant yet pretty and pleasing. It may be grown in pots, and if pinched can be kept fairly compact and suitable for a small house. On the other hand, if there is plenty of room against a wall or pillar it may be planted out under glass and allowed to ramble, when it will soon cover a considerable area and bloom profusely. Heliotropes are tender but may be planted out of doors in June. There are several beautiful varieties, and none better than Lord Roberts, mauve, but the old lilac species, peruvianum ("Cherry Pie"), should not be overlooked, as it is very floriferous and sweet.

Standard Heliotropes. Formed by pinching out the side shoots to a height of 1 ft., and then letting a few shoots start. These can be stopped at about 4 ins. long to induce laterals, and so a head is formed.

Compost. Loam, with a fourth of decayed manure, and some sand, is suitable.

Propagation. By seeds sown under glass in spring, or by cuttings in late summer in a warm house.

Heliotrope, Winter. See Petasites.

Helipterum (hē-lĭp-ter-um. Ord. Compositæ). Pretty everlastings related to the Helichrysums. H. Manglesi is the same as the popular rose everlasting offered by seedsmen under the name Rhodanthe Manglesi; it is charming as a pot plant, several plants being grown in a pot. Treat as a half-hardy annual (see Annuals). H. roseum is the same as Acroclinium roseum (see Acroclinium). The H. Sandfordi of seedsmen is the H. Humboldtianum of botanists. It is an annual, with yellow flowers; height about 1 ft.

Hellebore, White or False. See Veratrum.

Helleborine. See Epipactis.

Helleborus, Christmas and Lenten Roses (generally hĕll-ĕ-bōrus, although there is a case for hĕll-ĕb-orus. Ord. Ranunculaceæ). The popular Christmas Rose belongs to this genus. It is the white species niger; see Christmas Roses. Orientalis is the rose-coloured Lenten Rose, of which there are now many interesting varieties, or hybrids raised by crossing orientalis and niger. The Lenten Roses

are nominally hardy, but they thrive best in a sheltered place; and if planted in deep well-manured soil may be left undivided for several years with advantage. Viridis, height 18 ins., is the Green Hellebore. Atrorubens, with purple flowers, caucasicus with green flowers; and colchicus with purplish-red flowers, all growing about 18 ins. high, are good species. Propagation is by division after flowering.

Helonias (hel-ō-ni-as. Ord. Liliaceæ). The best-known species is bullata, a graceful hardy herbaceous perennial with rosy purple flowers in spring, height 1 ft. It likes a moist, shady place in loam and peat. Propagation by division in autumn when the clumps have become strong.

Heloniopsis. Serves the same purpose, and is suited by the same treatment as Helonias.

Hemerocallis, Day Lily (hĕm-ĕr-o-căl-lis. Ord. Liliaceæ). This short-lived flower makes up for its fugacity by blooming abundantly, and the plant is a graceful one, well adapted for sunny positions in the herbaceous border. It has a faint Honeysuckle-like perfume. If planted 1 ft. apart in clumps in autumn it makes an effective display in early summer, and a succession of flowers is produced over a long period. Aurantiaca and its form major are orange-coloured. Flava is a lemon-coloured species. Fulva is a large orange-coloured species, of which there is a variegated-leaved variety; both grow 2½ to 3 ft. high, and need more room than the others, which grow about 18 ins. high. Kwanso is a double with bronzy flowers; there is a variegated-leaved variety of this also. There are many fine modern hybrid Day Lilies, which may be selected at shows and in nurseries. The Day Lilies may be increased by division in spring.

Hemlock Spruce. See Tsuga canadensis.

Hemp. The Giant Hemp (Cannabis sativa) is more important economically than horticulturally, but is sometimes used for sub-tropical gardening. Height 6 to 10 ft. Propagation is by seed sown outside early in May.

Hen-and-chickens. See Bellis (Daisy). The name is also applied to Saxifraga umbrosa.

Hepatica (he-păt-ica. Ord. Ranunculaceæ). These charming little plants are now classed with the Anemones by botanists, but they are generally grown separately in gardens. They are beautiful plants, growing about 4 ins. high, and blooming freely in winter. They are not particular as to soil, but must have shade. The species is Anemone Hepatica (Hepatica triloba), blue; and there are several varieties with red, mauve, pink, or white flowers; some single, others double; the double white is beautiful. Propagation should be by seed, when obtainable, in preference to division, because Hepaticas do best when left undisturbed to form colonies, as under trees.

Heracleum (hē-rac-leum. Ord. Umbelliferæ). The species giganteum is the Cow Parsnip, the white umbels of which are borne on stems 7 to 9 ft. high. It is only suitable for the wild garden, where it thrives in any poor soil, and seeds freely.

HERBACEOUS PLANTS

In considering special features for the flower garden (see Flower Gardens) we drew attention to the importance of herbaceous

borders, which play so prominent a part in modern gardens, and we now give consideration to suitable plants for such borders and furnish some useful tables, with other information.

Strictly speaking, any plant which loses its leaves and stems at the end of the growing season is herbaceous, so that annuals may be covered by the term; but for garden purposes it will be convenient to consider none but perennial leaf-losing plants as herbaceous, treating annuals separately (see Annuals).

Here, to begin with, are brief particulars of some of the most important plants in tabular form; very dwarf kinds are omitted as more suitable for the rockery:

General Selection—Plants not exceeding 2 ft. high.

Kind	*Colour*	*Flowering Season*
Achillea, The Pearl	White	Summer
Anemone Pulsatilla	Violet	Spring
Anthericums	White	Summer
Antirrhinums	Various	Summer and autumn
Aquilegia (Columbine)	Various	Late spring
Armeria cephalotes	Pink	Late spring
Aster Alpinus	Purple	Autumn
,, Amellus	Purple	Late summer
,, dumosus	Mauve	Autumn
Campanula carpatica	Blue	Summer
,, muralis	Blue	Summer
Centaurea montana	Blue	Summer
Corydalis nobilis	Yellow	Summer
Delphinium nudicaule	Red	Summer
Dielytra spectabilis	Pink	Summer
,, formosa	Red	Summer
Dodecatheon (American Cowslip)	Various	Spring
Doronicum austriacum	Yellow	Spring
Erigeron speciosus	Violet	Summer
Funkia grandiflora	White	Summer
Gentiana Andrewsi	Blue	Early summer
Geranium Endressi	Pink	Summer
,, lancastriense	Lilac	Summer
,, sanguineum	Red	Summer
Geum coccineum	Red	Summer
Gillenia trifoliata	Pink	Summer
Hemerocallis	Orange	Summer
Lobelia cardinalis	Red	Summer
,, fulgens	Red	Summer
Lychnis Viscaria fl. pl.	Pink	Summer
Meconopsis cambrica (Welsh Poppy)	Yellow	Summer
Monarda didyma (Bergamot)	Red	Summer
Morina longifolia	Purple	Summer
Orobus aurantius	Yellow	Early summer
Papaver nudicaule (Iceland Poppy)	Yellow	Summer

Herbaceous Plants—*continued.*

General Selection—Plants not exceeding 2 ft. high—(continued).

Kind	*Colour*	*Flowering Season*
Plumbago Larpentae	Violet	Summer
Polemonium Richardsoni	Blue	Summer
Primula japonica	Rose	Spring
Ranunculis aconitifolius	White	Summer
Saxifraga granulata	White	Summer
Senecio pulcher	Rosy purple	Summer
Spiraea palmata	Red	Summer
Tradescantia virginica	Blue	Summer
Trillium grandiflorum	White	Spring
Triteleia grandiflora	Lilac	Spring
Veronica longifolia subsessilis	Blue	Summer

General Selection—Plants from 2 to 4 ft. high.

Kind	*Colour*	*Flowering Season*
Achillea eupatorium	Yellow	Summer
,, millifolium roseum	Rose	Summer
Aconitum (Monkshood)	Blue	Summer
Anemone, japonica and varieties	Rose, white, etc.	Late summer
Aster Novi-Belgii, varieties	Blue, mauve, lilac, etc.	Autumn
,, ericoides	White	Autumn
,, diffusus horizontalis	Rosy lilac	Autumn
Campanula persicifolia alba plena	White	Summer
,, Trachelium	Blue	Summer
Centranthus ruber (Valerian)	Red	Summer
Chrysanthemums	Various	Autumn
Echinops ritro	Lilac	Summer
Iris germanica	Various	Summer
Lilium candidum	White	Summer
,, chalcedonicum	Red	Summer
,, Martagon	Red	Summer
Paeony	Various	Summer
Pentstemon	Various	Late summer and autumn
Phlox	Various	Summer
Pyrethrum	Various	Spring
Rudbeckia grandiflora	Purple and yellow	Summer
Spiraea Aruncus	White	Summer
,, Filipendula	Cream	Summer
Tulips, late varieties	Various	May

Kind	*Colour*	*Flowering Season*
Aster Novi-Angliae	Various	Autumn
Delphinium	Mostly blue	Summer
Epilobium angustifolium	Red	Summer
Eremurus himalaicus	White	Summer
,, robustus	Pink	Summer
Gynerium (Pampas Grass)	White	Autumn
Helianthus (Sunflower)	Yellow	Late summer and autumn
Lilium auratum	Yellow, spotted	Summer
,, giganteum	White	Summer
Polygonum (Knotweed)	White, yellow	Summer
Rudbeckia maxima	Yellow	Summer
Solidago (Golden Rod)	Yellow	Late summer

In addition to the natural species, there are numerous garden varieties and hybrids. Each plant is treated separately in its alphabetical place in the present book. See Achillea, Anemone, Antirrhinum, Aquilegia, Aster, etc.

Propagation. The majority of the herbaceous plants are best propagated by division when the borders are gone through, as they should be every year. In dividing them, it should be remembered that the outside parts are generally stronger than the central portions. Many good herbaceous plants may, however, be raised from seed (see Table V), and with a little forethought a valuable stock of plants can be provided. A simple way of dealing with them is to sow the seed in drills outdoors in June, with Wallflowers and other biennials, thin the rows, and set the plants in a spare bed in July, drawing from this nursery when planting time comes. Those which are not forward enough to transplant the first year may be left till the second. In certain cases, as mentioned in the cultural notes under each plant, cuttings may be used for increasing the stock.

Staking. The object of good culture—to get large, vigorous, freely-bloomed plants—is frustrated unless timely and adequate staking is done. It is no exaggeration to say that the beauty of an herbaceous border is doubled from mid-July onward by good staking. Loose, floppy plants are made compact, fresh growth is encouraged, and with new shoots comes another crop of flowers. Ordinary flower sticks and thin bamboo canes are of little use; strong stakes 4 to 6 ft. long, according to the plant, are required. These can be bought from florists, painted green, and with the base pointed and tarred or otherwise dressed; or light unbarked poles can be bought, pointed and dressed. This is a suitable job for wet weather. In tying, there should be two bands of raphia or twine, one about a third and the other about two-thirds the height of the clump. Or the shoots may be looped. See also Flower Gardens.

Sites for Herbaceous Borders. The herbaceous borders will probably bear relation to the principal path and lawn, on the boundaries of which they are likely to find places. Is there a curving carriage

drive or walk up to the principal entrance to the house? Then the herbaceous border may curve beside it. Is there an area of ground beyond the lawn? Then a border of shrubs, or of fruit trees faced with selected shrubs and Rose pillars, may form the back portion of it and a belt of herbaceous plants the front. It is immaterial whether the border be straight or curved, because any stiffness of outline can be overcome in the arrangement of the plants. It must have an open, unshaded position if a wide selection of the best plants is wanted. A densely enclosed, heavily shaded site need not go entirely plantless, because, as Table II shows us, there are plants which flourish in shade; but it will not grow everything. Overhanging trees mean shade and drip, which the majority of herbaceous plants dislike. There is the further trouble that the nearness of many large trees means an obstacle to cultivation and plant nourishment in the form of strong, far-reaching roots.

Shelter has its value, especially in gardens swept by cold winds, and one will not despise a wall, a fence, a hedge, or a belt of shrubs and trees if it is obviously serving a good purpose; but to a considerable extent the border can provide its own shelter in the form of kinds which are of strong, hardy growth. For example, Michaelmas Daisies move early, grow fast in good soil, and when well staked are unaffected by the strongest and coldest of winds. Boltonias, Goat's Rues, Ox-eye Daisies, and Golden Rods are also both tough and bulky. It is merely a question of stout stakes well driven down. In choosing a site for our principal herbaceous border we shall try to provide for a bold sweep near the front of the house—a sweep which shall bring under the eye all the best portions of the border, if not, indeed, the whole of it. And if we cannot so arrange matters, we shall at least take care that one portion, specially treated and carefully planted, shall give us a good effect.

Arrangement. A whole series of gardens within gardens can be provided by the simple device of setting strong Rose pillars at equal distances along the back of the border and treating each "compartment" thus created separately. There might, for example, be one "bay" of Phloxes, and others of Delphiniums, Paeonies, Spiraeas, Heleniums, Giant Poppies, Kniphofias, and so on. These bolder things would fill the main area of the bay; for the front, Pentstemons, Campanulas, Coreopsis, Gaillardias, Geraniums, Geums, Inulas, Irises, Day Lilies, Linarias, Potentillas, Statices, Polyanthuses, Arabises, Aubrietias, and various bulbs would be suitable. This is almost the ideal method of arranging herbaceous borders, because, in the first place, herbaceous gardening is linked with Rose-growing in one of its most delightful forms; because in the second the border is never bare; and because in the third individual and local interest is combined with general effect. The gardener who is a lover of climbing and rambling plants generally need not confine his pillars to Roses, but may introduce Clematises and other plants. With the first mild spell towards the end of winter a film of green will run along the Rose pillars, giving the border a finished appearance before the herbaceous plants proper have made much growth; but not, perhaps, before the earliest bulbs have broken into bloom. Thenceforward there will always be interest, always beauty, always perfume,

without a suspicion of stiffness or sameness, until the hard frosts of autumn come.

Where there is a long, unbroken line of border, one of the first objects must be to provide material for continuous flowering or leaf-beauty at short intervals, otherwise there may be considerable lengths which are entirely without colour at particular periods of the year. Paeonies are invaluable for this " spacing," so to term it, because from the first day that they come through the soil in winter until they wither in autumn they are handsome. Funkias, too, are helpful, together with such things as Lavender Cotton, Silver Salvia, Silver Milfoil, Day Lilies, Sea Hollies, Verbascums, and Veronicas (for full selections see tables), nearly all of which have leaf as well as flower beauty to recommend them.

Colour-grouping: Difficulties. Colour-grouping is an interesting phase of herbaceous gardening, but apt to be disappointing, not so much owing to faults of composition, nor even of execution, as to the effects of the weather on growth. Some of the group-components are larger and some smaller than the normal. Or influences of soil or weather cause changes of colour which upset calculations. Nevertheless, those who aim at beautiful harmonies are animated by high artistic ideals and deserve every encouragement. They attain their desire with experience. The beginner will do well to content himself with the simpler objects of making a good selection of plants, getting a knowledge of their habits, and arranging them in such ways as to keep every section of the border bright and well-furnished from spring to autumn. When he has got thus far he will have paved the way for more advanced work. The tables give guidance as to selections and habit, while further assisting with information on colour and season of flowering. Perhaps they alone would suffice to put the beginner on the right path, but there are a few general rules worth stating.

Colour-grouping: Backgrounds. In the first place, there is background. An area of ground in which herbaceous plants alone are set at given distances apart, and more or less in tiers according to height, will give a satisfactory effect at midsummer, when most of the plants are at their best, but it is incomplete and in winter will be bare. With a background of selected shrubs, still better with the shrub-background supplemented by pillars for climbers, it will be furnished at all seasons of the year. Shrubs and small trees which have well-marked foliage tints, such as Purple Nuts, Purple-leaved Plum, variegated Negundo and other Maples (including the cut-leaved Japanese varieties), Golden and variegated Elders, Euonymuses, Berberis, and variegated Dogwood, can be used with great advantage. Nor must we forget trees with beautiful bloom or berry such as Thorns, Mountain Ash, Crabs, Apples, species of Pyrus and Prunus, Laburnum, and Magnolias. These shrubs and trees should form " mixtures " at the back; they should not be set in stiff lines. Evergreen species should be mixed with leaf-losers. Some of the trees should be on standard stems, so that the heads are carried above the level of the shrubs and herbaceous plants. The fact that the introduction of evergreens robs the border of its strictly " herbaceous " character should not weigh with the planter for a moment; we are out for beautiful effects, not for definitions. Somewhat in front of the shrubs, due allowances being made for the extension of

the latter, will come the pillars and these must be set in a true line at a given distance from the edge of the border if the poles are to be single and connected with top pieces. If they are to be disconnected groups they need not be in strict line.

Colour-grouping: The Groups. With or without the above auxiliaries the grouping of the herbaceous plants must be done with equal care. We say "grouping," because experience teaches that the group system is far better than the dotting system. If the border is too small to permit of putting the larger kinds in groups, leave them out altogether in preference to putting them singly, and make up the groups with smaller kinds. A mixture of individual plants is apt to look "spotty" and inconclusive. But the grouping system, though sound in principle, has its pitfalls. One might sin by forming large groups in small borders, because of the dullness when the plants were out of bloom. Groups of three plants suffice in most borders, and at planting the same forethought with respect to extension must be practised as with shrubs; it is rare that a yard apart for the components of the group is excessive. Criticism is sometimes directed towards the common amateur's plan of setting his plants in regular tiers from back to front according to the height of the plants, on the ground that it is monotonous and stiff. It is, however, less objectionable when grouping is practised, and indeed in principle it must rule, only being departed from to the extent of setting tall things of somewhat columnar habit, such as Delphiniums, Eremurus, Hollyhocks, and Verbascums, rather at the middle than at the back; but even in respect to these there should not be a continuous line along the centre.

Colour-grouping: Planting. We construct the body of our border, then, with a series of groups, the plants in the group, as well as the groups themselves, set in triangles and freely spaced. It is no bad thing to put the bigger things in first, working from one end of the border to the other with them before dealing with the smaller kinds, but that is not vital. What is essential is definite arrangement of the plants before planting is done. On a winter day one visualises the border six months ahead, seeing here a glowing cluster of Phloxes, there an azure pyramid of Delphiniums, yonder a mass of bronzy Paeony leafage surmounted with great perfumed globes of pink or crimson. Colour leaps into ardent life. And so one lays down group after group, considering each in relation to the other, taking care to provide differences in habit and foliage among near neighbours as well as differences in flower. A planter who is bent on naming all his plants—and for the first year or two names are very helpful—may "plant" his border up first with the labels instead of laying down the clumps if he thinks proper. And having got each group represented by its label into position, he can perhaps call in an expert critic to amend the planting project. Be that as it may, only after the principal groups have been actually laid down ought the spade to come into use. With the spade there should be used a long rod marked in feet and yards. Do not worry about "stiffness"; we hear far too much of that in connection with herbaceous borders. With the aid of the rod, set the principal back groups a given distance from the front edge of the border and do not allow them to vary.

And set them also at specified distances from each other in the line, varying only to allow for differences in habit, or if the habit is not known, not varying at all. Follow the same plan with each tier of groups from back to front and the border will develop on far more satisfactory lines than if the plants are put in higgledy-piggledy in a vain effort to secure "informality." As to distances, it is difficult to make definite rules, but generally 12 ft. apart for back-row groups, 9 ft. for middle, and 6 ft. for front will work out satisfactorily. The 9-feeters will not come directly in front of the 12-feeters, but will be angled between them, and similarly the 6-feet class will be angled with the 9-feet.

Colour-grouping: Special Plants. Three main lines of groups will suffice for all except the largest of borders. The foremost component of the front line of groups must not come nearer than 4 ft. from the edge of the border, otherwise when it has grown out to its full extent it will encroach on that selection of cherished smaller plants, annual, biennial, perennial, and bulbous, which every lover of hardy flowers likes to have immediately under his eye. Here in their season will be Daffodils, Christmas Roses, Crocuses, Snowdrops, Tulips, Irises, Snakeshead Lilies, American Cowslips, Day Lilies, Heucheras, Linarias, Clarkias, Godetias, Anemones, Arabises, Aubrietias, Chionodoxas, Scillas, Doronicums, Hepaticas, Primulas, Lungworts, Columbines, Snapdragons, Geums, Daisies, Polyanthuses, Tiarellas, and the thousand and one beautiful things which, while unsuitable for bold grouping, are nevertheless so exquisite in small clusters along the edge of the grass. All these gems are the "fillers-in." They are never forgotten and their turn comes when the framework of the border has been constructed with the bigger things which, when in full beauty, will form such glorious objects from points of vantage near house, entrance, and lawn. It is by proceeding on such clear, defined, intelligible, and practical lines as this that the best borders are made with the fewest mistakes. Now for a few useful tables.

I. BEAUTIFUL GROUPING PLANTS FOR HERBACEOUS BORDERS WHICH FLOWER BETWEEN JUNE AND AUGUST

Name	*Position of group in border*	*Colour*	*Propagation (Also Table V)*	*Soil*
Aconitum Fischeri	Front	Blue	Division	Ordinary
Alstromerias	Front	Yellow and orange	Division	Ordinary
Anemone japonica	Front	Rose, white	Division	Ordinary
Aster (Michaelmas Daisy), early sorts	Back, Middle	Mauve, blue, lavender, etc.	Division, cuttings	Ordinary
Bocconia cordata	Back	Buff	Division	Ordinary
Buphthalmum salicifolium	Front	Yellow	Division	Ordinary
Buphthalmum speciosum	Back	Yellow	Division	Ordinary

I. Beautiful Grouping Plants for Herbaceous Borders which Flower between June and August—*continued*

Name	*Position of group in border*	*Colour*	*Propagation (Also Table V)*	*Soil*
Campanula pyramidalis	Back, Middle	Blue, white	Seeds	Deep loam
Centaurea macrocephala	Front	Yellow	Seeds, division	Ordinary
Chrysanthemum maximum (Moon Daisy)	Middle	White	Division	Ordinary
Chrysanthemum leucanthemum (Ox-eye)	Middle	White	Division	Ordinary
Chrysanthemum uliginosum	Back	White	Division	Ordinary
Delphinium	Back, Middle	Blue	Division	Deep loam
Eryngium (Sea Holly)	Middle	Blue	Division	Ordinary
Galtonia candicans	Front	White	Bulbs	Deep loam
Gypsophila paniculata	Middle	White	Division	Ordinary
Helenium	Front	Yellow, striped	Division	Ordinary
Helianthus (Sunflower)	Back	Yellow	Seeds, division	Ordinary
Hollyhock	Back, Middle	Rose, white, crimson	Seeds, cuttings	Deep loam
Kniphofia (Tritoma)	Middle	Orange	Division	Deep loam
Lupinus polyphyllus	Front, Middle	Blue	Division	Ordinary
Lychnis chalcedonica	Front	Orange	Division	Ordinary
Meconopsis Wallichii	Front	Blue	Seeds	Deep, moist
Monarda didyma (Bergamot)	Front	Red	Division	Ordinary
Oenothera (Evening Primrose)	Front	Yellow	Division	Ordinary
Paeony	Front, Middle	Pink, rose, crimson, white, etc.	Division	Deep loam
Papaver orientale	Front	Scarlet	Division	Ordinary
Phlox	Front, Middle	Various	Division	Ordinary
Pyrethrum	Front	Various	Division	Ordinary
Rudbeckia	Front	Yellow	Division	Ordinary
Solidago (Golden Rod)	Back	Yellow	Division	Ordinary
Spiraea Aruncus	Back	White	Division	Ordinary
Verbascum	Back, Middle	Yellow	Division	Ordinary

The following are a few of the best of the smaller plants flowering at the same season:

Achillea Ptarmica The Pearl
Anthericum Liliastrum major
Campanula carpatica
C. glomerata dahurica
C. grandis
C. latifolia macrantha
C. persicifolia alba, fl. pl.
Centaurea montana alba
Coreopsis lanceolata
C. grandiflora
Erodium Manescavi
Funkias
Gaillardias
Geranium sanguineum
G. pratense
G. ibericum
Geum Mrs. Bradshaw
G. montanum Heldreichii
Hemerocallis (Day Lily) aurantiaca major
H. flava
Inula glandulosa
Irises in variety, Spanish, English, and German, besides species and hybrids
Linaria dalmatica
Lychnis Viscaria splendens, fl. pl.
L. vespertina
Meconopsis nepalensis
Morina longifolia
Oenothera fruticosa Youngii
Papaver nudicaule (Iceland Poppy)
Pentstemons
Physalis Franchettii
Platycodon grandiflorum Mariesii
Polygonum affine
Potentilla fruticosa
Prunella grandiflora
Scabiosa caucasica
Sidalcea candida
Snapdragons
Spiraea palmata
Statice latifolia
Thalictrum aquilegifolium
T. minus
Veronica gentianoides variegata
V. longifolia subsessilis
V. spicata

The foregoing, with Carnations, Violas, and selected annuals, will make the front of the border bright and interesting after earlier things of about the same height, such as Adonis vernalis, Alyssum saxatile compactum, Anemone coronaria, A. fulgens, A. sylvestris, Aquilegias, Arabises and Aubrietias, Arnebia echioides, Chrysogonum virginianum, Corydalis nobilis, Dielytra spectabilis, double Daisies, Dodecatheon Meadia (American Cowslip), Doronicums, Epimediums, Iberises (perennial Candytufts), early Irises, Lilies of the Valley, Lithospermum prostratum, Orobus vernus, Phlox Nelsoni, P. subulata varieties, Polyanthuses and Primroses, Sanguinaria canadensis, Saponaria ocymoides, Scilla campanulata, S. nutans, Tiarella cordifolia, Trolliuses, Tulips, Daffodils and other bulbs, and Veronica prostrata, have gone out of bloom.

Amongst the latest bloomers will be: Japanese Anemones, Michaelmas Daisies, Boltonia asteroides, Ox-eyes, Erigeron glaucus, Goat's Rues (Galega), Gladioli, Heleniums, Kniphofias, Sunflowers, Lobelia cardinalis, Sedum spectabile, Senecio pulcher, Silene Schafta and Tricyrtis hirta.

By "ordinary soil" in the table is meant both light and heavy soils provided they are well dug and manured. A certain number of the plants will only give of their best when the soil is deep, rich, and friable, and for these "deep loam" has been suggested. This does not mean that the plants will not thrive in clay provided it is well drained and is made fertile and friable to a good depth. As a matter of fact, clay suits nearly all herbaceous plants when it is

free from stagnant water and in a crumbly condition. If, however, it is damp and stiff, such valuable plants as Phloxes and Hollyhocks will suffer severely from disease. Plenty of mortar rubbish is beneficial. Ashes may also be used liberally.

II. A TABLE OF HERBACEOUS PLANTS WHICH THRIVE IN SHADE

It sometimes happens that what would otherwise be an ideal site for an herbaceous border is marred by the fact that a portion of it is in shade for the greater part of the day, but the difficulty can be overcome by assembling in the shaded portions certain plants which enjoy shade. Many good plants thrive better in shade than in sun and the following table gives the salient points about them:

Kind	*Appr. height in feet*	*Colour*	*Propagation*	*Soil*
Anemones, spring	½	Blue, rose, etc.	Tubers	Ordinary
,, Japanese	1½	Rose, white, etc.	Root cuttings	Ordinary
,, Hepaticas	¾	Blue	Division	Ordinary
Aquilegias	2	Blue, white, etc.	Seeds, division	Ordinary
Asperula (Woodruff)	¾	White	Division, seeds	Ordinary
Asphodelus ramosus	5	White	Division, seeds	Ordinary
Astilbe (Spiraea) astilboides	3	White	Division	Deep, moist
Astilbe japonica	2	White	Division	Ordinary
,, rivularis	4	White	Division	Deep, moist
Astrantia major	2	Striped	Division	Ordinary
,, carniolica	1	White	Division	Ordinary
Auriculas, Alpine	¾	Yellow, etc.	Seeds	Ordinary
Betonica grandiflora	1	Violet	Division	Ordinary
Buphthalmum salicifolium	2	Yellow	Division	Ordinary
Campanulas of sorts				
Cardamine (Dentaria) diphylla	1½	White	Division	Peat
,, pratensis, double form (Lady-Smock)	1½	Soft purple	Division	Peat
Clematis integrifolia	3	Blue	Seeds	Ordinary
Corydalis nobilis	1½	Yellow	Seeds	Ordinary
Cyclamen Coum	¼	Purple	Seeds	Ordinary
,, europaeum	¼	Red	Seeds	Ordinary
Dielytra (Dicentra) eximia	1	Red	Division	Ordinary

II. A Table of Herbaceous Plants which Thrive in Shade—*continued*

Kind	*Appr. height in feet*	*Colour*	*Propagation*	*Soil*
Dielytra (Dicentra) spectabilis	2	Rose	Division, cuttings	Ordinary
Digitalis (Foxglove)	6–10	Various	Seeds	Ordinary
Dodecatheon (American Cowslip)	1½	Rose, etc.	Seeds, division	Ordinary
Doronicum (Leopard's Bane) austriacum	1	Yellow	Division	Ordinary
Doronicum Harpur Crewe	3	Yellow	Division	Ordinary
Epimedium macranthum	1	Blue, white	Division	Ordinary
Epimedium pinnatum	1	Yellow	Division	Ordinary
Eranthis (Winter Aconite)	¼	Yellow	Tubers	Ordinary
Eryngium alpinum	2	Blue	Seeds, division	Light
Fritillaria Meleagris (Snakeshead Lily)	1½	Purple, etc.	Seeds, bulbs	Ordinary
Funkias (Plantain Lily)	1–1½	Handsome foliage	Division	Sandy
Geranium pratense	2½	Purple	Division	Ordinary
Geum Heldreichii	1½	Orange	Division	Ordinary
,, Mrs. Bradshaw	1½	Crimson	Seeds	Ordinary
Hellebores (Christmas Roses)	1	White, etc.	Division	Ordinary
Heuchera sanguinea	1	Red	Seeds, division	Light
Hypericum (St. John's Wort)		The best of these are yellow-flowered shrubs		
Liliums		Most of these fine bulbs do best in partial shade		
Lily of the Valley	¾	White	Bulbous crowns	Ordinary
Lychnis vespertina	1½	White	Division	Ordinary
Meconopsis Wallichii	2–3	Blue	Seeds	Deep, moist
Mimulus cardinalis	2	Scarlet	Seeds	Ordinary
,, cupreus vars.	1	Orange, spotted, etc.	Seeds	Ordinary

II. A Table of Herbaceous Plants which Thrive in Shade—*continued*

Kind	*Appr. height in feet*	*Colour*	*Propagation*	*Soil*
Monarda didyma	1½	Red	Division	Ordinary
Narcissi (Daffodils)				
Omphalodes verna	½	Blue	Seeds, division	Ordinary
Polyanthuses and other Primulas				
Sanguinaria canadensis	½	White	Seeds, division	Sandy peat
Saxifrages, most sorts				
Scilla festalis (nutans) Wood Hyacinth	1–1½	Blue, rose, white	Bulbs	Ordinary
Sedum spectabile	1	Flesh pink	Division	Ordinary
Solomon's Seal	2	Greenish white	Division	Ordinary
Spiraeas (see Astilbes)				
Thalictrum minus	1	Graceful leaves	Division	Ordinary
,, aquilegifolium	3	Graceful leaves	Division	Ordinary
Tiarella cordifolia	1	White	Division	Ordinary
Trillium grandiflorum	1	White	Bulbs	Ordinary
Trollius asiaticus	1½	Deep yellow	Division	Ordinary
,, europaeus	1½	Pale yellow	Division	Ordinary
Veratrum album	3	Greenish white	Division	Ordinary
,, nigrum	3	Purple	Division	Ordinary
Veronicas, most do well in shade				
Vinca major	Trailer	Blue	Division	Ordinary
,, minor	Trailer	Blue	Division	Ordinary

III. A TABLE OF HERBACEOUS FLOWERS FOR CUTTING

The moderate cutting of flowers from herbaceous plants conduces to continued blooming, but where very large quantities of flowers are required it may be worth while to consider growing a selection of plants in a reservation, otherwise the borders may be denuded. In such a selection the following should be included:

Achillea Ptarmica The Pearl
Alstromerias
Anemones of many kinds
Aquilegias
Arabis, double form
Asphodelus albus

Asters of sorts
Astilbes of sorts
Astrantias of sorts
Boltonia asteroides
Chrysanthemums of sorts
Coreopsis of sorts
Delphiniums
Doronicums
Echinops ritro
Erigeron speciosus superbus
Eryngiums of sorts
Francoa sonchifolia
Gaillardias
Geum Mrs. Bradshaw and others
Gypsophila paniculata
Heleniums of sorts
Helianthuses (Sunflowers)
Hellebores (Christmas Roses)
Hemerocallises (Day Lilies)
Heuchera sanguinea
Irises of sorts
Kniphofias of sorts
Lilies of the Valley
Lobelia cardinalis
Lychnis Viscaria splendens plena
Monarda didyma (Bergamot)
Paeonies of sorts
Phloxes of sorts
Physalis Alkekengi
Physalis Franchettii
Platycodon Mariesii
Potentilla formosa
Primulas of sorts
Scabiosa caucasica
Senecio pulcher
Spiraeas and Astilbes
Thalictrums
Tiarella cordifolia
Veronicas of sorts

IV. A TABLE OF BEAUTIFUL ANNUALS FOR HERBACEOUS BORDERS (see also Annuals)

There are two special and particular reasons why annuals should be used freely in herbaceous borders: they are beautiful in themselves and they fit in admirably with bulbs, thereby facilitating the use of such beautiful late-blooming things as Darwin Tulips, Calochorti (on warm, dry soils), Spanish Irises, and the bolder Scillas of the nutans and campanulata types. Both hardy and half-hardy kinds can be employed. Although it is common to sow the hardy sorts where they are to bloom and thin them down to the proper number, it is questionable if it is not best to sow the principal kinds on prepared beds and transplant them, in order to make sure of a limited number of good plants. That each grower may consider for himself. Only the best kinds should be selected, such as the following:

Kinds	*Height in feet*	*Colour*	*Flowering season*
Hardy:			
Alyssum maritimum	1	White	Summer
Argemone grandiflora	2	White	Summer
Bartonia aurea	2	Yellow	Summer
Calliopsis Drummondii	1½	Brown and yellow	Summer
Candytuft	1	White spiral	Summer and autumn
Chrysanthemum coronarium	2½	Yellow	Summer

IV. A Table of Beautiful Annuals for Herbaceous Borders (see also Annuals)—*continued*

Kinds	*Height in feet*	*Colour*	*Flowering season*
Hardy (continued):			
Chrysanthemum coronarium	2½	White	Summer
,, carinatum	2½	Purple, white, and yellow	Summer
,, inodorum plenissimum	1½	White	Summer
Clarkia elegans	2	Special vars., pink, salmon, scarlet, etc.	Summer
Convolvulus minor	1	Blue, etc.	Summer
Delphinium Blue Butterfly	1	Blue	Summer
Eschscholtzia crocea and special vars.	1	Orange	Summer
Glaucium tricolor	1	Scarlet, yellow, and black	Summer
Godetia Schamini (double rose and special vars.)	2	Rose	Summer and autumn
Ionopsidium acaule	¼	Violet	Summer carpeter
Larkspur	1–2	Blue, rose, etc.	Summer
Lavatera	3–4	Pink, also white var.	Summer and autumn
Linum grandiflorum	1¼	Crimson	Summer
Lupinus subcarnosus	1	Blue and yellow	Summer
Nemophila insignis	½	Blue and white	Summer (spring if sown in late summer)
Nigella Miss Jekyll	1	Blue	Summer
Phacelia campanularia	¾	Blue	Summer
Poppies, Shirley	1¼	Salmon, orange, etc.	Summer
,, double Paeony	3	Scarlet, white, etc.	Summer
Saponaria calabrica	½	Pink	Summer (spring if sown in late summer)
Scabious, sweet	1½–2½	Purple, rose, etc.	Summer
Silene pendula	½	Pink	Summer (spring if sown in late summer)
Sweet Peas	5–8	Many shades	Summer

IV. A Table of Beautiful Annuals for Herbaceous Borders (see also Annuals)—*continued*

Kinds	*Height in feet*	*Colour*	*Flowering season*
Hardy (continued):			
Sweet Sultan	1½	Yellow etc. Bridegroom, mauve; The Bride, white; and Bridesmaid, canary, are pretty varieties	Summer
Sunflowers	3–10	Yellow	Summer and autumn
Half-hardy:			
Asters, China, in variety	1–3	Various colours	Summer and autumn
Marigolds, French	1	Gold-striped	Summer
,, African	2	Orange, lemon	Summer
Nemesia strumosa	1	Orange, cream	Summer
Phlox Drummondii	1	Various colours	Summer
Salpiglossis	2	Various colours	Summer
Stocks, ten-week	1–2	Various colours	Summer
Zinnias	2	Various colours	Summer

Mignonette will doubtless be introduced for its fragrance, although not brilliant in colour or in any way conspicuous. Virginian Stock may be considered. Arctotises, Collinsias, Erysimums, Gilias, Kaulfussia, Linarias, Malopes, Nolana, Oxyura, Sanvitalia, Venus's Looking Glass, Viscarias, and Whitlavias have their admirers. Nasturtiums are not ideal for herbaceous borders, because of their encroaching and seed-scattering habits. Nevertheless they have claims.

And some will want to find places for the best of the annual ornamental Grasses, such as Agrostis elegans, nebulosa, and pulchella (Cloud Grasses), Briza maxima and minima (Quaking Grasses), Coix lachryma (Job's Tears), Eragrostis elegans (Love Grass), Hordeum jubatum (Squirrel-tail Grass), and Lagurus ovatus (Hare's-tail Grass).

For all annuals and Grasses and for such dwarf biennials and perennials as can be flowered the same year from seed if sown under glass in winter (e.g. Verbenas, Tom Thumb Snapdragons), thus coming into line with annuals culturally, the extreme front area of the border will be the right place. Here Snowdrops, Crocuses, Snowflakes, Scillas, and other low-growing bulbs will rise above the Aubrietia carpet in late winter to be followed by Daffodils and Tulips in April and May. The annuals, set amongst the fading bulbs, will speedily afford fresh interest and beauty.

V. A TABLE OF GOOD HERBACEOUS PLANTS
(most of which can be raised from seed, as well as by division)

Kind	*Best Species or Varieties*	*Remarks*
Achillea	Filipendulina—Clavennae —Ptarmica The Pearl	Quite hardy—any soil
Aconitum	Fischeri—Wilsoni—Napellus bicolor	Monkshoods—most soils —poisonous
Adonis	vernus and var. sibirica —pyrenaica	Brilliant yellow flowers—any soil
Alstromeria	aurantiaca — chilensis —Pelegrina	Any soil—tuberous roots —graceful
Althaea	rosea vars. (Hollyhocks)	Best from seed as there is less disease — annual vars. are good
Anchusa	italica Dropmore and Opal	Noble Alkanets—magnificent blue flowers—best treated as biennials
Anemone	Coronaria vars.—fulgens —Pulsatilla—sylvestris	The brilliant Crown Anemones come readily from seed
Anthericum	Liliastrum major—liliago	Graceful Lilyworts—any soil
Antirrhinum	majus vars. tall, medium, and dwarf	The named vars. of Snapdragon come true from seed and may be grown as annuals or biennials
Aquilegia	Long-spurred caerulea hybrids — chrysantha —glandulosa—Skinneri	The lovely Columbines are best treated as biennials from seed
Asclepias	tuberosa	Orange flowers—best in peat
Aster	Amellus vars.—Novae Angliae	Michaelmas Daisies—any soil
Astilbe	Arendsii vars.	Graceful—various colours —like moist soil
Aubrietia	Dr. Mules—Fire King—graeca — Hendersoni—Leichtlini	Lovely carpeters — true from seed
Bellis	perennis vars. Longfellow, The Bride, etc.	Double Daisies
Betonica	grandiflora	Any soil
Bocconia	cordata (japonica)—microcarpa	Fine plants for back of border
Calceolaria	Golden Glory	Brilliant yellow — nearly hardy
Campanula	carpatica and vars.—glomerata lactiflora—latifolia and vars.—Medium and vars. (Canterbury Bells)—persicifolia and vars.—pyramidalis and var. alba	Immense variety of habit —best of border and rockery plants—any soil —Canterbury bells should be treated as biennials

V. A Table of Good Herbaceous Plants (most of which can be raised from seed, as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Canna	Crozy hybrids	Start in heat—not hardy—handsome foliage and brilliant flowers
Carnation	Border vars.—Margaret—Grenadin	Seedlings treated as biennials bloom abundantly and are generally healthy — best named show vars. must be raised from layers to ensure trueness, but seedlings are strong and brilliant
Centaurea	macrocephala—montana	Any soil
Cheiranthus	Allionii—Cheirii (Wallflower)	Best treated as biennials, sowing outdoors in May
Chrysanthemum	Leucanthemum vars.—maximum vars.	Moon Daisies and Ox-eyes—any soil
Cimicifuga	cordifolia—racemosa	Any soil
Cistus	ladaniferus—laurifolius	Good shrubs for sunny sides
Clematis	Davidiana—integrifolia—recta	All erect growers—any soil
Clianthus	puniceus	Hardy against a wall in mild places—likes peat—very brilliant
Columbine	See Aquilegia	
Coreopsis	grandiflora—lanceolata	Any soil — good for cutting
Corydalis	lutea—nobilis—thalictrifolia	Light soil
Delphinium	Belladonna and vars.—cardinale — grandiflorum vars. including Blue Butterfly and Azure Fairy — nudicaule—various named hybrids	These magnificent plants are the pride of the July border—deep, rich soil
Dianthus	See Carnation—Barbatus is the Sweet William—plumarius is the garden Pink—most others are rock plants—sinensis Heddewigii and vars.	Sweet Williams are best treated as biennials; the Pinks are perennials; Heddewigii is best as an annual
Dictamnus	Fraxinella—albus. The "Burning Bush"	An inflammable resin on the stems may be ignited hence the popular name—seed long in germinating

V. A Table of Good Herbaceous Plants (most of which can be raised from seed, as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Digitalis	purpurea—gloxinoides	Purpurea is the common Foxglove; gloxinoides in mixture gives finer vars. Foxgloves may be broadcasted in the garden, preferably in shade
Dodecatheon	Meadia	American Cowslips; generally bought from the bulb dealer, but may be raised from seed; like peat and loam
Doronicum	caucasicum	Early bloomer—any soil
Dracocephalum	Ruprechti—Ruyschiana	Dragon's heads — very pretty—any soil
Echinacea	purpurea and vars.	Handsome Composites—like good loam
Echinops	ritro—ruthenicus	Globe Thistles—resemble Eryngiums
Epilobium	angustifolium, rose; luteum, yellow	Willow Herbs—like shade—do well at waterside—tall and brilliant
Eremurus	Bungei — himalaicus — robustus and rare var. Elwesianus	Magnificent for back of border—flower spikes 6 to 10 ft. high—worthy of special culture
Erigeron	aurantiacus ("Orange Daisy") and vars.—Coulteri — speciosus (Stenactis speciosa), etc.	Free-blooming Composites, mostly dwarf, but speciosus about 3 ft.—any soil
Erodium	Manescavi — macradenum, etc.	Related to the hardy Geraniums — dwarf, with purple flowers—any soil
Eryngium	alpinum—amethystinum —Bourgati—planum	The beautiful Sea Hollies —large metallic-looking flowers—any good soil
Foxglove	See Digitalis	
Gaillardia	grandiflora and vars.	Rich brown and yellow; Lady Rolleston is a fine true yellow, but uncertain from seed—any soil
Galega	officinalis and vars.	The Goat's Rues — any soil — last long — Hartlandi has variegated foliage in spring

V. A Table of Good Herbaceous Plants (most of which can be raised from seed as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Gentiana	acaulis — asclepiadea — bavarica—lutea, etc.	Acaulis is good for edging where it thrives; the others are tall enough for the border; most of the Gentians are rockery plants
Geranium	argenteum — armenum —Endressi — ibericum —pratense and var. album—sanguineum and vars. album and lancastriense — Wallichianum, etc.	These are the true hardy Geraniums; very free-flowering and bright—any soil
Geum	coccineum and var. Mrs. Bradshaw—Heldreichii and var. superbum — montanum and var. maximum	Brilliant dwarf border plants; Mrs. Bradshaw is the best; any soil
Gilia	coronopifolia	Brilliant red spikes of bloom 3 ft. high—should be raised in frame
Gillenia	trifoliata	Graceful plant—any soil
Glaucium	flavum and var. tricolor	The Horn Poppy—2 ft. high—any soil
Gypsophila	paniculata	Beautiful gauzy inflorescence—3 ft. high; the bush is attractive and the flowers mix with most bloom—any soil
Hedysarum	coronarium	French Honeysuckle—3 ft.—any soil
Helenium	autumnale and vars. Riverton Beauty and striatum	Brilliant late-blooming Composites; 3 ft.—any soil
Helianthemum	vulgare and vars.	Sun Roses—thrive on dry hot banks—like sand and chalk
Helianthus	orgyalis—rigidus	The best of the Sunflowers are annuals, but these tall perennials are worth attention — any soil
Helleborus	niger, the Christmas Rose, also mixed hybrids	Ripe seed essential for quick germination—do well mixed with ferns in shady places

V. A Table of Good Herbaceous Plants (most of which can be raised from seed as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Hemerocallis	flava, the sweet yellow Day Lily	Graceful plant, good for cutting
Hesperis	matronalis and var. alba —tristis	The Sweet Rockets—tristis, a biennial, is scented at night—2 ft.
Heuchera	brizoides and vars.—sanguinea and vars.	Brilliant and graceful for front of border — any well-drained soil
Hollyhock	See Althaea	
Honesty	Lunaria biennis and vars.	Brilliant flowers, followed by silvery pods—any soil—like shade
Hunnemannia	fumariaefolia	Yellow Poppywort—a biennial—any soil
Incarvillea	Delavayi—grandiflora—Olgae	Distinct and beautiful—large showy flowers—loamy soil
Inula	glandulosa and var. superba	Brilliant yellow and orange Composites — like rich, well-drained soil
Isatis	glauca	Yellow — 3 ft. — early summer—any soil
Kniphofia	corallina — Macowani — aloides and vars.	The "Red-hot-pokers"—fiery clubs in late summer—deep, moist soil
Lathyrus	latifolius and vars., notably albus and White Pearl	The Everlasting Peas—beautiful on stumps and palings
Liatris	pycnostachya—spicata	Graceful purplish racemes of bloom—3 ft.—well-drained soil
Libertia	formosa—grandiflora	Beautiful Irids—require light, friable, warm soil —1½ ft.—lovely white flowers and evergreen foliage
Linaria	dalmatica	Yellow flowers and glaucous leaves—3 ft.—most of the perennial species are trailers suitable for rockeries
Linum (Flax)	flavum — narbonense — perenne and var. album	Graceful and brilliant—any well-drained, light soil

V. A Table of Good Herbaceous Plants (most of which can be raised from seed as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Lobelia	cardinalis—fulgens and vars.	Splendid scarlet flowers; fulgens Queen Victoria has purple leaves—rich friable soil is desirable
Lunaria	See Honesty	
Lupinus	arboreus and var. Snow Queen—polyphyllus and vars.—Somerset	Arboreus is a shrub with pale yellow flowers and deeply-cut foliage, flowering in June; of polyphyllus there are white, pink, mauve, and yellow vars.; Somerset is a hybrid with pale yellow flowers—any good soil
Lychnis	Arkwrightii — chalcedonica — fulgens — Haageana and vars.	Brilliant perennials of medium height and slender habit — any soil — Fulgens and Haageana flower the same year if sown early under glass
Lythrum	Salicaria and var. superbum	Loosestrifes—purplish red spikes 3 ft. high — like damp places
Malva	moschata and var. alva	Musk Mallows—any soil
Matthiola (Stock)	All the year round — Brompton — East Lothian	The first is white; there are several colours of the others, which are biennials; the East Lothians are generally grown in pots
Meconopsis	aculeata, blue—cambrica, yellow Welsh Poppy and vars.—integrifolia, glorious primrose Chinese species—nepalensis, claret — paniculata, yellow Himalayan species—Wallichii	Immense interest centres in the new Poppies from the East—all except the Welsh are biennials — nepalensis and Wallichii love moisture
Mertensia	sibirica	Lovely dwarf plant with violet flowers in pendent clusters — friable, well-drained soil
Michauxia	campanuloides	Noble plant with large white Campanula-like flowers—4 ft.—any good soil

V. A Table of Good Herbaceous Plants (most of which can be raised from seeds as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Mimulus	cardinalis—cupreus	Generally grown as half-hardy annuals
Morina	longifolia	White tubular flowers—any soil
Myosotis	alpestris and vars.—dissitiflora and vars.—sylvatica	The Forget-me-nots
Myrrhis	odorata, " Sweet Cicely "	White flowers and perfumed foliage—any soil
Nepeta	Mussini	Violet flowers—any soil
Oenothera	glauca (Fraseri) fruticosa major—Lamarckiana—speciosa—taraxacifolia	The Evening Primroses—yellow and white—biennials and perennials—any soil
Ononis	rotundifolia	Rose flowers—dwarf habit—sandy loam desirable
Onosma	albo-rosea	Charming dwarf plant with white or rose flowers—sandy loam
Orobus	vernus, blue; and dark form purpureus	Pretty dwarf early-blooming plants—any good soil
Ostrowskia	magnifica	Large, pale blue Campanula-like flowers—3 ft.—fertile, friable soil
Ourisia	coccinea	Exquisite dwarf plant—likes shade and a peaty soil—scarlet racemes
Paeonia	lutea	Beautiful new plant—yellow flowers—2 ft.—deep clay or loam
Papaver	nudicaule and vars.—orientale and vars.—pilosum	Biennial and perennial Poppies — brilliant colours—any soil
Pentstemon	barbatus and var. Torreyi — glaber — Hartwegii (gentianoides) and white var.—Menziesii—Murrayanus—Scouleri	Charming hardy perennials — suitable for border and rockery—the florists' named vars. are also desirable — moist, rich soil
Phlox	decussata vars.	Among the best of middle-height herbaceous perennials—any soil
Phormium	tenax	A graceful evergreen—4ft.—deep loamy soil
Physalis	Franchetti	Large scarlet berry—any soil

V. A Table of Good Herbaceous Plants (most of which can be raised from seed as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Physostegia	speciosa	Purplish spikes—any soil
Phyteuma	campanuloides	Violet spikes—3 ft.—any good soil
Phytolacca	decandra	Tall spikes of purple berries—damp site
Platycodon	grandiflorum and vars., of which Mariesii is a good dwarf form	Blue flowers, resembling Campanulas—any good soil
Polemonium	caeruleum, blue—confertum mellitum, blush, sweet—reptans, blue, dwarf — Richardsonii, blue	Beautiful plants for the front of the border—any good soil
Polyanthuses and Primroses	Good mixed strains should be procured	Lovely dwarf plants for the front of the border in spring
Poppy	See Papaver	
Potentilla	Fremontii, yellow—nepalensis (formosa) and var. Willmottiana — mixed species	Excellent for front of border—free, bright, and lasting—any soil
Primula	Beesiana, purple whorls — Bulleyana, apricot whorls—capitata, purple —Cockburniana, orange umbels—denticulata and vars.—Forrestii, yellow —Lissadell Hybrid, vermilion — japonica and vars. — Littoniana, mauve—Poissoni, purple —pulverulenta, crimson and orange—sikkimensis, yellow drooping, etc.	Many of the Primulas are better suited to the rockery than the border, but those named may be grown in selected spots. They are worthy of special study as to soil and site
Prunella	grandiflora	Violet—dwarf—any soil
Pulmonaria	rubra	Pretty dwarf plant—red flowers—any soil
Pyrethrum	Parthenium—roseum	Parthenium is the double white Feverfew, of which the well-known Golden Feather is a var.—any soil—the florists' named vars. are forms of roseum
Ranunculus	aconitifolius — amplexicaulis	Suitable for damp spots with peaty soil

V. A Table of Good Herbaceous Plants (most of which can be raised from seed as well as by division)—*continued*

Kind	*Best Varieties or Species*	*Remarks*
Rehmannia	angulata	Distinct and beautiful plant needing warm site and friable, loamy soil—2 ft.—purple flowers
Romneya	Coulteri	Magnificent Poppywort—3 ft.—large white flowers—friable, well-drained soil—litter should be thrown over rootstock in winter
Rudbeckia	laciniata—speciosa	Good Composites—yellow or orange—middle border—any soil
Salvia	azurea grandiflora (Pitcheri) and var. alba	Blue flowers—height 3 ft.—not perfectly hardy—patens and splendens and its varieties are beautiful but not hardy—splendens Pride of Zürich is a brilliant bedding and border plant for summer
Saponaria	ocymoides and vars.—officinalis and vars.	Ocymoides is best suited for trailing on the rockery — the double white form of officinalis is a good border plant, height 3 ft.—any soil
Saxifraga	Cotyledon—longifolia—Megasea and vars.—peltata—umbrosa	Most of the Saxifrages are best suited to the rockery, but those named are adapted to the border. Umbrosa is the well-known London Pride, so popular for edging—any soil
Scabiosa	atropurpurea and vars.—caucasica and vars.	Atropurpurea is a hardy biennial—height 3 ft.—several beautiful named vars.—caucasica is a fine blue perennial — height 1½ ft.—any soil
Sedum	spectabile	Pink flowers—height 1 ft.—flowers in Sept.—any soil—most other Sedums are best on the rockery

V. A Table of Good Herbaceous Plants (most of which can be raised from seed, as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Senecio	Clivorum, orange, 3 ft.—Doronicum, yellow, 1 ft.—Wilsonianus, yellow, 6 ft.	Very showy plants, most with handsome foliage—like peat and loam—Clivorum is a grand plant on a moist site
Sidalcea	candida—malvaeflora and vars.	Pretty Mallows—height 3 ft.—Candida is a good plant in rich loam
Solidago	canadensis — Shortii — Virgaurea	The Golden Rods—tall, graceful plants with yellow flowers in late summer—any soil
Spiraea	Aruncus — Filipendula —Ulmaria	Any soil that is not very dry—good for middle positions in border
Stachys	coccinea	Scarlet—1 ft.—any soil
Statice	Gmelini, violet panicles, 2 ft.—incana nana, pink, 1 ft.—latifolia, lavender panicles, 2 ft.—sinensis, yellow and white, 1½ ft.	The Sea Lavenders—graceful and distinct plants—useful for cutting—any good soil
Stock	See Matthiola	
Stokesia	cyanea and vars.	Beautiful blue flowers—height 1 ft.—good for rockery or border where the soil is light and warm
Sunflower	See Helianthus	
Sweet William	Dianthus barbatus	Pink Beauty, Scarlet Beauty, etc., are pretty vars. which come true from seed—hardy biennials, best sown outdoors in May or June
Thalictrum	adiantifolium, 1 ft.—aquilegifolium, 3 ft.	Grown for the pretty Adiantum-like foliage—any soil
Thermopsis	Caroliniana	Long yellow spikes—4 ft.—any soil
Trollius	caucasicus—europaeus	Yellow—1 ft.—sow as soon as ripe
Veratrum	album nigrum	The False Hellebores—flowers in long panicles—any soil

V. A Table of Good Herbaceous Plants (most of which can be raised from seed, as well as by division)—*continued*

Kind	*Best Species or Varieties*	*Remarks*
Verbascum (Mulleins)	Chaixii, yellow and white vars., 3 ft.—hybridum yellow and white vars., 6 ft. biennials—olympicum, yellow, 6 ft. biennial — phoeniceum, yellow, 3 ft.	The flowers are in tall spikes and the plants are suitable for back or middle of border—any soil
Verbena	Hybrids in various colours	Although perennials, the Verbenas are often treated as half-hardy annuals, being raised from seed in late winter —good for bedding
Veronica	gentianoides—longifolia —spicata and white var.	Good plants for the front of the border — blue flowers—any soil—many species are shrubs and others best on rockery
Viola		Clumps of Violas may be put in borders, but they are mostly used for bedding and the rockery
Wallflower		The Wallflowers are biennials and are best sown outdoors in May or June; like chalk or lime; Golden Tom Thumb, Cloth of Gold, Blood Red, Fire King, Primrose Dame, Ruby Gem, and Vulcan are popular varieties
Zauschneria	californica	A very pretty and distinct plant with orange spikes about 1 ft. long—likes friable, loamy soil

It may be assumed that there are few private growers of hardy herbaceous plants who will sow even the half of the hundreds of species here enumerated, but the selection caters for all and the reader may pick and choose at will. At least the list shows that there are hardy perennials and biennials in great variety of which large stocks of plants can be raised from seed at very moderate cost.

A collection will be of great value in furnishing herbaceous borders economically.

Herb Grace. See Rue under Herbs below.

Herbs (Sweet and Pot). The good housewife makes ready use of kitchen-

garden herbs, whether for soups, flavouring, garnishing, or medicinal purposes. The most useful are the following:

Angelica (s)
Balm (p)
Basil, Sweet and Bush (s)
Borage (s)
Camomile (p)
Chervil (s)
Chives (p)
Dill (s)
Fennel (p)
Horehound (p)
Hyssop (p)
Lavender (p)
Marigold, pot (s)
Marjoram, pot (p)
,, Sweet (s)
Mint (p)
Pennyroyal (p)
Rampion (s)
Rosemary (p)
Rue (p)
Sage (p)
Savory, Winter (p)
Sorrel (p)
Southernwood (p)
Tansy (p)
Tarragon (p)
Thyme, common (p)
,, Lemon (p)
Wormwood (p)

The simplest plan of growing all those marked (p) is to buy roots and plant them in well dug and manured soil early in April, but seeds of several are procurable and may be sown in spring if preferred. Mint spreads rapidly at the root, and should be divided every 3 or 4 years. Those marked (s) are generally raised from seed in spring, sowing in drills 1 ft. apart on light, friable soil in a sunny spot. For drying, the herbs should be gathered when mature, and laid in a dry, shady place. When dry they may be stored in paper bags. The uses of the various herbs may be briefly indicated as follows:

Angelica. Cooking and candying, seeds for flavouring
Balm. Tea and wine
Basils. Flavouring
Borage. Flavouring drinks, also for bees
Camomile. Medicinal
Chervil. Salads, flavouring
Chives. Salads, flavouring
Dill. Flavouring
Fennel. Garnishing, sauces
Horehound. Medicinal
Hyssop. Pot herb, medicinal
Lavender. Perfume
Marigold. Flavouring
Marjoram. Flavouring
Mint. Flavouring
Pennyroyal. Tea
Rampion. Winter salads
Rosemary. Tea, oil
Rue. Medicinal
Sage. Flavouring
Savory. Flavouring
Sorrel. Salads
Southernwood. Perfume
Tansy. Garnishing
Tarragon. Salads, flavouring
Thyme. Flavouring
Wormwood. Medicinal

Hermaphrodite. Flowers which contain both male and female organs. See also Dioecious.

Herniaria, Rupture Wort (her-ni-ār-ia. Ord. Illecebraceæ). The small species glabra is in demand by carpet bedders, who use it for making lines and cushions of green. It is a hardy plant, not fastidious as to soil, and easily propagated by division in autumn.

Heron's-bill. See Erodium.

Hesperis, Rocket (hĕs-peris. Ord. Cruciferæ). Hardy biennials and perennials, thriving in ordinary soil, and easily propagated by seed or division. The Sweet Rocket, Dame's Rocket, or Dame's Violet, H. matronalis, is a perennial with purplish flowers, but the colour is

variable. There are several forms of this handsome and fragrant old plant, which will grow almost anywhere, and thrives in chalk. The double white (Scotch Rocket) is a great favourite. Tristis is a biennial, also variable in colour, and sweetest at night.

Heuchera (hēū-chera. Ord. Saxifrageæ). Heuchera sanguinea is a highly esteemed hardy plant, producing close tufts of roundish leaves and long graceful sprays of brilliant rosy-carmine flowers. Other colours have been obtained by selection and crossing. The plant is a hardy herbaceous perennial, and may be raised from seed or by division in spring. Height about 18 ins. It is not particular about soil, and does well on limestone. It enjoys a little shade. Both as a border and rockery plant the Heuchera is desirable. The flowers are charming for cutting. Pubescens (grandiflora), pale red; micrantha, with yellowish flowers; and brizoides, rose, are also worth growing.

Hibbertia (hib-bēr-tia. Ord. Dilleniaceæ). Evergreen greenhouse trailers. Dentata, the yellow flowers of which contrast well with the dark leaves and ruddy stems, blooms in winter. Sandy loam with a third of peat suits. Propagation is by cuttings in a propagating case in spring.

Hibiscus (hī-bis-cus. Ord. Malvaceæ). This genus includes both herbaceous and shrubby plants, annuals and perennials. The following are popular: Manihot, a greenhouse rambler with yellow spotted flowers; Rosa sinensis, a stove rambler with rosy-crimson flowers in winter, several varieties; and syriacus (Althaea frutex), a hardy deciduous shrub with purple flowers, blooming late in summer; there are many varieties of it, which thrive near towns. Propagation is by cuttings, those of the indoor species in heat, those of the hardy ones in cold frames. Sandy loam, with leafmould, makes a good compost. Plant in autumn or spring.

Hieracium, Hawkweed (hī-er-ā-cium. Ord. Compositæ). Hardy herbaceous perennials, of which villosum, 1 ft. high, with downy leaves and yellow flowers in July, is one of the best for the rockery. Aurantiacum, orange, 1½ ft., is good for the border. Ordinary soil. Propagation by seeds or division.

Hippeastrum (Amaryllis). Hip-e-ăs-trum. Ord. Amaryllideæ). As stated under Amaryllis, the large and brilliant flowers grown in pots under the name Amaryllis are really Hippeastrums. However, the popular name persists and no great harm seems to follow. See Amaryllis.

Hippocrepis, Horseshoe Vetch (hippo-crē-pis. Ord. Leguminosæ). The most popular species is comosa, a trailing native plant with feathery foliage and pretty clusters of yellow flowers. It is worth a place on the rockery, where it will thrive in ordinary soil. Propagation by division.

Hippophae, Sea Buckthorn (hĭp-pŏph-ăe. Ord. Elaeagnaceæ). The species rhamnoides, the Sea Buckthorn, is a hardy deciduous shrub which thrives on sand-hills close to the sea, where it may attain a height of 8 to 10 ft. and become conspicuous with its grey foliage and, in the case of the female form, the crop of yellowish fruits. One of its great merits is that it will thrive in sand and on chalk in other places and endure exposure. It may be propagated by seeds, suckers, and layers. One or two bushes of the male form should be planted with the others to ensure abundant berrying. Plant in autumn or spring.

Hoe, Hoeing. One of the most useful of garden tools, the Dutch hoe is good for running through the soil to loosen the surface and uproot small weeds; 4-in. and 6-in. are useful sizes. The draw hoe, of which the swan-neck is an improved form, is good for dealing with larger weeds when a chopping action is required. The Sproughton may be used either as a push or draw hoe, and is a good although somewhat heavy tool. The Canterbury, made with 2 or 3 teeth, is good for drawing large drills and for earthing Potatoes. Regular hoeing is good for crops, particularly in dry weather, because it prevents the soil cracking and drying. The various forms of hoe should be of steel, mounted on ash handles.

Holly, Ilex (ī-lex. Ord. Ilicinæ). One of our most beautiful evergreens, the Holly does good service in the garden, and shines with a bright and cheerful glow in our rooms at Christmas. It will thrive in most soils, but it is a slow grower in its early stages on the best of land, and on a poor chalky soil may show only a few inches of fresh growth a year until it is well established. A deep, fertile, moist, but drained soil is desirable. The best time for planting is April, when, shifted with a mass of fibrous roots, planted immediately, and watered in, it generally thrives.

Propagation. By seeds, but the choice varieties are increased in the nurseries by grafting on common stocks. Cuttings will strike in summer.

Varieties. The following are good: argentea, marginata, argentea medio-picta (Silver Milkmaid), aurea medio-picta (Gold Milkmaid), aurea regina (Golden Queen), ferox argentea (Silver Hedgehog), Hodginsii, and Watereriana. All except Hodginsii have variegated leaves. Among more modern species and varieties may be named Ilex Pernyi, close habit, very distinct, and its larger form Veitchii; Fargesii, also quite distinct; and corallina, drooping, coral-coloured berries. Cornuta is the Horned Holly. As stated under Hedges (which see), Holly may be used as a hedge plant, but in this, as in other methods of use, care in pruning is necessary, so that stumps are not exposed unduly.

Holly Fern. See Aspidium (Polystichum) Lonchitis.

Hollyhock (Althaea rosea. Ord. Malvaceæ). A grand old favourite, the Hollyhock has suffered for many years through the attack of a fungus, Puccinia malvacearum, which begins on the lower leaves and works its way up the stems, completely disfiguring the plants. An early application of Bordeaux Mixture (which see) is a remedy.

Propagation. Many consider that the disease was induced by excessive vegetable propagation in bygone years, when named varieties were in demand; consequently, they now grow Hollyhocks as seedlings, raising them out of doors in early summer and planting out in autumn, the same as Wallflowers. The various colours come pretty true from seed, and as seed of several is available, especially among the doubles, the grower who wants particular plants for special positions may very well get separate packets. Propagation may also be effected by cuttings in spring, in sandy soil, in heat, and by grafting.

Positions. One finds it a good plan to keep the plants in a bed to themselves, in an open spot, through the winter and to transplant them in the spring, because when they are shut in among larger

plants throughout the summer and autumn, as is the case when they are put into the border as seedlings, they do not get enough sun and air.

Fertilisers. It is wise to allot the places for them in the autumn, and to dress the sites with basic slag and fine lime, ½ lb. of the former and 1 lb. of the latter per square yard, digging both well in. The slag supplies phosphates, which help to fortify the plants, and as spraying with Bordeaux Mixture or Burgundy Mixture, as practised on Potatoes, has the drawback of disfiguring the plants, every effort should be made to keep them healthy by natural means. In cold, exposed places the plants ought to be wintered in frames. A deep fertile, well-drained soil is desirable, but the manuring should be moderate, as it is not desirable to make the growth succulent.

Annual Hollyhocks. The annual forms should be remembered, for they can be treated just as Stocks and Asters are, being sown in gentle warmth under glass towards the end of winter and planted out in June, to bloom in July or August. There are both double and single strains of the annuals, and there is likewise a strain of annual doubles with fringed flowers.

The Antwerp or Fig-leaved Hollyhock is Althaea ficifolia, which see.

Holly, Sea. See Eryngium.

Holm Oak. See Quercus.

Honesty, Lunaria biennis (lū-nā-ria. Ord. Cruciferæ). The Honesty derives its name from the flat white transparent seed pods which follow the flowers. These pods may be cut in sprays and used for room decoration in winter. The plant is a hardy biennial, easily raised from seed in late spring, and will thrive in most soils if the site is shady, but prefers a moist, heavy soil, in which it seeds itself freely. It is attractive when in bloom, for the flowers are abundant, and are bright rose in colour. There is a white variety.

Honey Flower. See Melianthus major.

Honey Plant. See Hoya.

Honeysuckle, Lonicera (lŏn-i-cē-ra. Ord. Caprifoliaceæ). Beautiful hardy deciduous and evergreen twiners, suitable for covering walls, pillars, pergolas, trelliswork, and fences. They thrive in most soils. Planting should be done between November and mid-April inclusive. Propagation is by layers in autumn. The red fruits of some of the species are attractive. Flexuosa (brachypoda, japonica, chinensis) is one of the best of the Honeysuckles, and its variety, aureo-reticulata, which has small, gold-netted leaves, is a pretty plant. Caprifolium, with pale yellow flowers, and Periclymenum, yellow and red, are fragrant British species with attractive fruits. Sempervirens has scarlet and yellow flowers. The bush Honeysuckles should not be forgotten. Standishi, white, winter; Alpigena, red, spring; Xylosteum, yellow, several varieties; and syringantha, pink, shy bloomer, several forms, are good.

Honeywort. See Cerinthe.

Hoop Petticoat. See Daffodils (Narcissus Bulbocodium).

Hop. See Humulus.

Hop Tree. See Ptelea.

Hordeum jubatum (hōr-deum. Ord. Gramineæ). A hardy annual Grass, easily grown from a spring sowing in ordinary garden soil.

Horehound. See Herbs.

Horminum (hor-mī-num. Ord. Labiatæ). The species pyrenaicum, with blue flowers in early summer, height 1 ft., is a pretty plant of tufty habit, worth a place in the border or rockery. Ordinary soil. Propagation by division in spring.

Hornbeam. See Carpinus and Hedge.

Horse Chestnut. See Aesculus.

Horseradish (Cochlearia Armoracia. Ord. Cruciferæ). Well known as a relish and component of sauces, which are enlivened by its pungent flavour. The plant is a rank grower, and unless kept under control may become a nuisance. A few thongs should be planted in a small bed in spring, and when the plant begins to spread it should be replanted. One very good plan, as tending to keep the crop well in hand, is to plant diagonally in the sides of a small ridge of soil made up over a rich coat of manure.

Hotbeds. A hotbed is very useful in a garden. It may be made up in spring with manure alone. The material should be taken straight from the stables and turned well on successive days to drive off the rank gases; it should then be built up into a bed about a yard high, being well trodden as the work proceeds. A frame can then be placed on. Half-hardy annuals, Tomatoes, Cucumbers, Vegetable Marrows, Celery, and other crops can be raised in a manure-heated frame in spring, being sown in pots or boxes and stood on the manure. Dahlias and other plants can be started in it. A hotbed can also be used for growing Cucumbers and Mushrooms. In autumn, manure and leaves can be mixed to force a frame of Violets. See the various crops and plants named.

Hoteia. The Hoteia barbata and H. japonica of some florists is the same as the Spiraea japonica of bulb-dealers (not of botanists). Its proper name is Astilbe japonica. See Astilbe.

Hothouse. See Greenhouses.

Hottonia (Water-violet). See Flower Gardens: The Water Garden.

Houseleek. See Sempervivum.

Houstonia (hoūs-tō-nia. Ord. Rubiaceæ). The species caerulea is a charming little plant for the rockery, clinging closely to the stones, and bearing blue flowers in spring. It likes a loamy soil, but does not object to lime. Serpyllifolia (Thyme-leaved), with lavender flowers in late spring, is another good species. Propagation is by division or seeds in spring. There is a white variety.

Hoya, Wax-Flower (hōy-a. Ord. Asclepiadeæ). There are several species of Hoya, all distinguished by flowers of waxy texture. The most popular is carnosa, pink, blooming in summer. There is a variety with variegated leaves. Bella, with purple and white flowers, is also grown. They are rambling plants suitable for the roof of a warm greenhouse, or a pillar. They like peat, with a third of loam and sand. Propagation is by cuttings in heat in spring or summer. The shoots should be thinned out when they become crowded. Vigorous syringing in summer will keep down mealy bug. Very little water should be given in winter. We know of a plant thriving for years in a sitting-room.

Humea (hū-mea. Ord. Compositæ). Humea elegans is one of the most pleasing of plants, not only on account of its appearance, although that is uncommon, but because of its piquant perfume.

It grows several feet high in a season, and produces long plumes of red inflorescence. Two or three plants will scent a large greenhouse. It is easily raised from seed, which may be sown in a warm frame or greenhouse in summer, the seedlings pricked off, potted singly, and repotted till they are in 6-in. or 7-in., in which they may bloom. Loam, with a third of decayed manure and some sand, makes a suitable compost. The plants may be discarded after flowering. It is thus treated as a biennial.

Humulus (hū-mulus. Ord. Urticaceæ). This genus gives us the commercial hop, which is used for flavouring beer. The Japanese Hop, H. japonica, is worth planting in the garden for the pillar of a pergola. It will thrive in ordinary soil, and may be increased by division in spring. There is a golden-leaved variety called aureus.

Humus. See Manures and Lime.

Hunnemannia, Mexican Tulip Poppy (hunne-măn-nia. Ord. Papaveraceæ). The species fumariaefolia is a brilliant Poppywort, with yellow flowers in late summer. It is a herbaceous perennial, but is generally grown as an annual. It is not entirely hardy, and needs a sheltered place or frame protection in winter if treated as a perennial. It may be propagated by seeds sown outdoors in summer, and likes light, well-drained soil.

Hutchinsia (hutch-in-sia. Ord. Cruciferæ). The most popular species of this small genus is alpina, a pretty little plant for the rockery, clinging closely to the stones and covering itself with white flowers in spring. It likes a sandy compost, and thrives on limestone. Propagation is by seed in spring.

Hyacinth. The "Dutch Hyacinths" of greenhouses and rooms, perhaps the most popular of all pot and water bulbs, have sprung from Hyacinthus orientalis. For cultivation, see notes under Bulbs. The following are a few good standard varieties, but meritorious novelties should be looked out for at the spring flower shows:

Varieties for Forcing

White Roman (pot in August and successionally)
Italian, various colours
Dutch Miniature, various colours
Prepared bulbs, various colours

Single White

Arentine Arendsen
Baroness van Tuyll
La Grandesse
L'Innocence

Single Blush

Grandeur à Merveille
La Franchise

Single Yellow

City of Haarlem
Yellow Hammer

Single Pink

Cardinal Wiseman
Gertrude
Gigantea
Jacques

Single Blue

Enchantress, light
Grand Maître, medium
Johan, light
King Alfred, mid-blue
King Menelik, very dark
King of the Blues, dark
Queen of the Blues, light
Schotel, light

Single Red

La Victoire
Robert Steiger
Roi des Belges

Doubles

Chestnut Flower, blush (looks charming in the garden planted among Pink Daisies)	Isabella, blush La Tour d'Auvergne, white Laurens Koster, blue

See also the specialities of bulb-dealers.

It is not necessary to buy first-size named Hyacinths for bedding, as dealers supply second-size bulbs in distinct colours. It is not customary to retain pot-, bowl-, and glass-grown Hyacinths after flowering, because these "first-size" bulbs generally deteriorate, but smaller bulbs may be planted out in borders after flowering if the soil is fertile and moist, because the bulbs sometimes grow on and do good service.

The Musk Hyacinth (Muscari moschatus), with yellow, musk-scented flowers, is an interesting plant which may be treated like the Muscaris.

The mauve Feather Hyacinth (Muscari plumosus), the blue Starch Hyacinth (Muscari racemosus), and the Amethyst Hyacinth (Muscari amethystinus), may also be grown.

Hyacinthus. The species amethystinus is the Spanish Hyacinth; H. orientalis is the common Hyacinth. The variety of orientalis called albulus is the white Roman Hyacinth. H. candicans (Galtonia candicans) bears a flower-spike which rises to a height of 4 ft., and a cluster of large, expanded, pendent, bell-shaped flowers. A group of it in a border, or a bed, planted 3 ft. apart, and interspersed with the cheap scarlet Gladiolus brenchleyensis, looks very fine. Both plants will thrive in any well-drained soil, and will probably be at their best in August.

Hybrid, Hybridisation. A hybrid is a cross between two species. In rare cases (e.g. amongst a few kinds of Orchids) genera have been crossed, and the offspring are called bigeneric hybrids. When hybrids are crossed between themselves the offspring are called varieties. When species are crossed the work is described as hybridisation; when varieties are crossed it is spoken of as cross-fertilisation. In both cases pollen is taken from the anthers of one flower and placed on the stigma of another, the process being termed pollination. This process would be ineffective if the stigma had been already pollinated, either by pollen from the same flower (self-fertilisation or selfing), or had been transferred by wind or bee from another flower; therefore the anthers must be removed from the flower to be crossed before the pollen is ripe, and the blossom must be enclosed with a muslin bag. Those who wish to hybridise systematically should study Mendel's laws, on which several books exist.

Hydrangea (hȳ-drān-gea. Ord. Saxifrageæ). The Hydrangeas are semi-hardy deciduous shrubs, and some species are grown exclusively in the open air; but others are esteemed as pot plants on account of their large heads of blooms. The Hydrangea is certainly the greatest of all tub plants for steps, terraces, and selected positions by water, because it makes a large and symmetrical bush well clothed with foliage, produces numerous large trusses of pink flowers, which retain their freshness and beauty for many weeks, and is so nearly hardy that it can be wintered safely in an unheated shed.

Pruning. When the plants have grown out, little pruning is

necessary, and what is needed can be done when the old flower trusses are cut away in autumn. They thrive for many years without retubbing if they are top-dressed with fresh loam annually. H. paniculata grandiflora, with white flowers, is also a good tub plant; it requires harder pruning than the pink.

Propagation. Cuttings for propagation may be taken in spring, and inserted singly in small pots in sandy compost containing leafmould in a warm frame, or shoots with buds may be struck in autumn. When the plants are well rooted they may be shifted to 5-in. or 6-in. pots, in which they may flower. Loam, with a little decayed manure or leafmould, and some sand, will suit. Young pot plants may be wintered in unheated frames.

Species and Varieties. The species most commonly grown in pots is hortensia (hortensis), which is not quite hardy. There are many varieties of it. Paniculata grandiflora is a splendid hardy Hydrangea with white flowers in late summer. Petiolaris, with Ivy-like leaves and white flowers in spring, is sometimes seen on an outside wall in mild districts, but it is not quite hardy. The Oak-leaved species quercifolia is also grown on walls. Of the newer species, Sargentii is one of the most distinct with its large velvety leaves. Aspera, mauve, and xanthoneura, cream, may be mentioned. Arborescens grandiflora, white, is a fine shrub.

Blue Hydrangeas. On the iron-containing soils of Sussex, Hydrangeas come blue when planted out in mild districts; the change from pink to blue can be effected under cultivation by using alum water, 1 oz. of alum per gallon of water used once a week.

Hymenanthera (hȳ-men-an-ther-a. Ord. Violaceæ). The best-known species is crassifolia, an evergreen shrub with yellow flowers in spring, followed by spiny white berries; height about 3 ft. It is not safe in very cold positions, although nearly hardy. It does best in peat and loam. Propagation is by cuttings in sandy peat under a bell-glass in summer. Plant in spring.

Hymenocallis. See Pancratium.

Hymenophyllum (hȳmen-ŏph-yllum. Ord. Liliaceæ). Filmy ferns. They thrive in peat with Sphagnum moss, broken sandstone, and sand. They must have a saturated atmosphere (see Ferns). Tunbridgense and unilaterale are the best-known species. H. Trichomanes is the Killarney Fern.

Hypericum, St. John's Wort (hȳ-per-icum. Ord. Hypericineæ). Useful hardy perennials, some herbaceous, others shrubby, with dense green foliage and yellow flowers. One of the most useful species is calycinum, 1 ft., the Rose of Sharon, or Aaron's Beard, for it will thrive on dry banks as well as under trees, and is practically evergreen. It should be planted 1 ft. apart in autumn if a close mass is wanted. Propagation is by cuttings in a frame. Patulum, 1 ft., is also evergreen; its modern forms Henryi and Forrestii are good. Hookerianum (oblongifolium) is worth growing, and Moserianum is a fine hybrid, an evergreen, 3 ft. high, not so completely hardy as calycinum. All those named are shrubs, and have yellow flowers in summer. Androsaemum, the shade-loving native Sweet Amber or Tutsan, 2–3 ft., is semi-shrubby. Perforatum is the common St. John's Wort, and is herbaceous, as are barbatum and reptans (creeping).

Hyssop. See Herbs above.

I

Iberis, Candytuft (ī-ber-is. Ord. Cruciferæ). Useful hardy annuals and perennials. For the former, see Candytuft and Annuals. The perennials, most of which are evergreen, are grown in the rock garden, and soon cover a considerable area. They are not fastidious about soil, and are easily increased by cuttings or seeds. The following are a few of the best: corifolia, 4 ins., resembles sempervirens; corraefolia, hybrid, 1 ft.; jucunda, 3 ins.; gibraltarica, not quite hardy, 1 ft.; semperflorens, 1 ft., rather tender, likes chalk; sempervirens, 1 ft., and its variety Garrexiana, which has larger flowers; and Tenoreana, rather tender. All except jucunda and gibraltarica, which are pink, and Tenoreana, rosy lilac, have white blossoms in early summer.

Ice Plant. See Mesembryanthemum.

Ichneumon Flies. As parasites on the large white cabbage butterfly caterpillar, these are friends of the gardener, and should not be destroyed.

Idesia (ī-dē-sia. Ord. Bixinæ). The only species is polycarpa, a Japanese tree which attains to a considerable size in its native country, but does not generally grow more than 10 or 12 ft. high in Europe. It has large heart-shaped leaves and drooping greenish yellow flowers. The female form (the tree is dioecious) bears orange-coloured berries. It should have a sheltered place and friable, well-drained soil. Propagation is by cuttings under a bell-glass in summer.

Ilex. See Holly.

Illicium, Aniseed Tree (ĭll-ĭc-ium. Ord. Magnoliaceæ). The species religiosum is the anise-scented, yellow-flowered shrub, so revered in the East. The purplish-red evergreen species floridanum is also fragrant. They like a sheltered place, and a good loamy, well-drained soil, in which they will grow 6 to 8 ft. high. Plant in spring.

Imantophyllum. See Clivia and Bulbs.

Imbricated. A flower is said to be imbricated when the petals lap over each other.

Immortelles. See Everlastings.

Impatiens, Balsam (im-pā-tiens. Ord. Geraniaceæ). One of the most popular species is Sultani, a dwarf plant with brilliant carmine flowers, easily raised from cuttings in a warm house, and so floriferous that it is hardly rooted before it begins to bloom. It thrives in loam, with a little leafmould and sand, in the greenhouse. Episcopi is a good variety of it. Hawkeri is also a good hothouse species with scarlet flowers. Holstii is an annual 1½ ft. high, cinnabar red, suitable for the greenhouse. The most popular of the Impatiens is, however, the half-hardy annual Balsam. See Balsam.

Impregnation. See Hybridisation (Pollination).

Inarching. A process under which a growing shoot of one plant is grafted on to the growing shoot of another. It is sometimes practised with Grape Vines, and also with Oranges, which see.

Incarvillea (in-căr-vĭll-ea. Ord. Bignoniaceæ). Beautiful hardy plants, of which the most popular species are Delavayi and grandiflora. Both have large, deeply-cut leaves and bell-shaped carmine-rose flowers in summer. They are hardy herbaceous perennials, growing in most soils, and easily raised from seed under glass in spring, or propagated by division. The height is about 18 ins. Grandiflora is considered by many to be merely a variety of Delavayi; brevipes is a purplish form of it. Olgae is a purple-flowered species growing somewhat taller.

Incense Cedar. See Libocedrus.

Indian Corn. See Maize.

Indian Cress. See Nasturtium.

Indian Fig. See Cactus (Opuntia).

Indian Pink. See Dianthus and Biennials. The Indian Pink is Dianthus chinensis.

Indian Shot. See Canna.

India-rubber Plant. See Ficus.

Indigofera (indi-gŏf-er-a. Ord. Leguminosæ). A large genus, only three shrubby species of which are of any garden value; these are decora, an evergreen with feathery leaves, 2 to 3 ft. high, red flowers in summer; Gerardiana, purplish-red flowers, 6 to 8 ft.; and Potaninii, with pink flowers. A friable compost of loam and leafmould suits these handsome shrubs, which are at their best in a sheltered place or on a wall. Propagation is by cuttings in sandy peat, preferably under a handlight.

Insecticides. See Nicotine and Paraffin.

Insectivorous Plants. See Dionaea, Nepenthes, Pinguicula, Sarracenia, and Utricularia.

Insects. The principal insect pests of plants are referred to under their own names in this work, or in connection with the crops which they affect, and remedies given. Many insects, among which may be mentioned ichneumon flies, lacewing flies, hover flies and ladybirds, are, however, beneficial as preying on plant pests. See Leaflet No. 37, "Beneficial Insects," obtainable from the Ministry of Agriculture, Whitehall, London, price fourpence.

Intercropping. See Vegetables.

Inula (ĭn-ula. Ord. Compositæ). The species glandulosa is a fine hardy herbaceous perennial, growing about 18 ins. high, and with large deep yellow flowers in summer. It is well worthy of a place near the front of the border. It thrives in most fertile soils, and likes clay if friable. Propagation is by division in spring. Helenium, the Elecampane, is a taller plant. Hookeri is a fine pale yellow species blooming in late summer. Others are macrophylla and Royleana, both yellow.

Involucre. Bracts crowded on one level, without flowers, at the base of an inflorescence, compose an involucre.

Ionopsidium, Violet Cress (ī-ō-nop-sid-ium. Ord. Cruciferæ). The species acaule is a dainty little violet-flowered hardy annual only growing about 2 ins. high. It succeeds in almost any soil, and is raised from seed sown where it is to bloom in spring.

Ipomaea, Convolvulus (ī-pō-māe-a. Ord. Convolvulaceæ). This genus is closely allied to that of Convolvulus, and some plants commonly called Convolvuluses are really Ipomaeas. C. major, for instance, is I. purpurea, a hardy annual. Of the plants usually grown under the name Ipomaea may be mentioned Bona-nox, a white hothouse evergreen twiner, blooming in late summer; hederacea (Nil), a blue half-hardy perennial twiner which may be grown outdoors in summer, and its varieties grandiflora and Huberi variegata; Horsfalliae, a rose winter-flowering hothouse evergreen twiner; Learii (Pharbitis Learii), a blue autumn-blooming hothouse evergreen; and versicolor (Mina lobata), a hardy annual, various colours. Quamoclit, scarlet, 3ft., is a tender annual. The annuals are raised from seed, the perennials from cuttings in sandy peat in heat. Loam, with some leafmould, decayed manure, and sand, makes a suitable compost. The hothouse climbers should be thinned after flowering. See also Convolvulus.

Iresine (ī-re-sī-ne. Ord. Amarantaceæ). The Iresines were more important plants in the old carpet-bedding days than they are now. They are tender perennials, dwarf, with narrow, highly-coloured leaves, which made them useful for formal designs. They thrive in most soils. Propagation is by cuttings in gentle heat towards the end of summer. They should not be potted off till spring, and need very little water in winter. Herbstii and Lindeni both have dark leaves and grow about 15 ins. high.

Iris (ī-ris. Ord. Irideæ). The Iris is a strikingly beautiful hardy flower, and it is not surprising that many people like to grow a collection. The larger, such as the Flag, English, and Spanish, may be planted in herbaceous borders; and the smaller on the rockery. The Flags have rhizome roots and evergreen foliage; the English and Spanish have bulbous roots and lose their leaves every year.

The following are some of the principal species of Iris; the bulbous species are marked (b); the Cushion Irises are marked (c):

alata (b)
atropurpurea
aurea
Bakeriana (b)
biflora
cristata
flavescens
florentina
Gatesii
germanica (Flag)
histrio
Hollandia (b)
iberica
laevigata or Kaempferi
Lorteti (c)
ochroleuca
pallida
Pavonia (Peacock Iris, not hardy) (b)
persica (b)
pumila
reticulata (histrio, histrioides, histrioides major and Krelagei are good varieties) (b)
sibirica
sindjarensis (b)
Sisyrinchium (b)
Susiana (c)
tingitana (b)
Tubergeniana
tuberosa (b)
unguicularis (stylosa)
variegata
xiphioides (English Iris) (b)
xiphium (Spanish Iris) (b)

Others of considerable interest are:

Boissieri (b)	Leichtlini (c)
bucharica (b)	Monnieri
chamaeiris	neglecta
Danfordiae (b)	orchioides (b)
foetidissima (native stinking Gladwin)	paradoxa
graminea	pseudacorus (Yellow Flag)
juncea (b)	Rosenbachiana (b)
Kolpakowskiana (b)	spuria
Korolkowi (b)	squalens

It would be impossible to describe these species fully in the space at disposal; moreover, the number of modern hybrids and varieties is so great, and their beauty makes them so important, that they have displaced the species to a considerable extent. The Iris-lover might obtain a special book on the genus. He should certainly look out for exhibits of Irises at the principal flower shows and in nurseries. Further (and perhaps most important), he should endeavour to inspect a representative collection in one or other of the special gardens of the country, such as that of the Royal Horticultural Society at Wisley in Surrey, where Irises are grown extensively; and where the older Flags, such as Gracchus, Iris King, Black Prince, Lohengrin, Isoline and Pallida dalmatica, may be compared with newer sorts.

A simple way for a beginner to start a collection is to obtain a dozen (or more) varieties of the noble tall bearded or crested Irises (which include the familiar German Flags) from a good nurseryman. August is the best month to plant or divide them, because fresh growth is then starting. They will thrive in any fertile garden soil, and will endure a town atmosphere. Flowering in May and June, they come between the spring bulbs and the bulk of summer annuals and perennials, thus filling a distinct gap. It is not uncommon for the leaves to become badly diseased in autumn, but this need not cause serious alarm, for if the foliage is cut to the ground-line in early winter, new and healthy foliage springs quickly and the plants flower well in the ensuing year.

In autumn, bulbs of the English, Spanish, and other bulbous Irises may be obtained and planted 1 ft. apart and 2 ins. deep. The English and Spanish may be set either in clumps or lines, to suit the circumstances. They are very cheap, will thrive in any friable fertile soil, and bear beautiful flowers in June. Bulb dealers offer distinct varieties under names. What are commonly called Hollandia or Giant Dutch Irises are also bulbous. They resemble the Spanish, but flower earlier.

The Oncocylus or "Cushion" Irises form an important group; and there is a sub-group called regelio-cyclus.

For the waterside, sibirica and the Japanese Irises (varieties of laevigata, which is the same as Kaempferi) may be chosen. The Japanese Irises, with their immense flat flowers of brilliant colour, are magnificent.

Irish Heath. See Daboëcia.

Irish Ivy. See Hedera.

Irish Yew, See Taxus.

Isatis, Dyer's Woad (ī-sā-tis. Ord. Cruciferæ). A small genus, only one species of which, glauca, a yellow hardy biennial, blooming in summer, is grown to any extent. Propagation is by seed, and ordinary soil suits. Woad is obtained from I. tinctoria. The industry is now of small proportions.

Isolepis (ī-so-lē-pis. Ord. Cyperaceæ). The species gracilis is a pretty grassy plant, well adapted for growing in small pots to stand at the edge of greenhouse stages, where, drooping over and making a foreground to flowering plants, it serves a useful purpose. It may be raised from seed in a frame or greenhouse, and when established may be increased by division in heat in spring. Loam, with a third of leafmould and some sand, suits it.

Itea (ī-te-a. Ord. Saxifrageæ). The one species grown is virginica, a hardy deciduous shrub with toothed leaves and Privet-like sprays of white flowers in early summer, height 6 to 8 ft. Ordinary garden soil suits, if friable and loamy. Propagation is by layering in autumn, or by cuttings inserted in sandy soil under a hand light in summer.

Ivy. A familiar evergreen climber. By keeping rain off walls it benefits them, though some damage may be done when true roots are produced under the influence of moisture or when the shoots are allowed to choke gutters. The balance is on the right side. See also Hedera.

Ivy-leaved Geranium. See Geranium and Pelargonium.

Ivy-leaved Toadflax. See Linaria Cymbalaria.

Ixia (ĭx-ia. Ord. Irideæ). Ixias are pretty, if somewhat artificial-looking, bulbs, growing about 1 ft. high, well adapted for culture in pots, but also thriving in sunny spots outdoors where the soil is light and well drained. They are useful for a cool greenhouse, succeeding the spring bulbs. Three may be put in a 5-in. pot, and given the bulb soil and treatment generally (see Bulbs in pots). The leaves are long and slender, like those of Gladioli, and the flowers are borne in Gladiolus-like spikes. Mixed bulbs, or in some cases named varieties, may be obtained from bulb-dealers in autumn.

Ixiolirion (ĭxio-lĭr-ion. Ord. Amaryllideæ). Charming hardy bulbs, flowering in June, suitable for the rockery or the front of the border. They are not particular as to soil. Propagation is by offsets. Montanum (tataricum) and Pallasi, 1 ft. high, with blue flowers in June, are two of the best.

Ixora (ĭx-ōr-a. Ord. Rubiaceæ). Brilliant hothouse plants, somewhat resembling Bouvardias, but with larger heads of bloom. They like a compost of 2 parts loam, 1 each leafmould and decayed manure, and some sand. Propagation is by cuttings in heat when the shoots are half matured. The young plants may be pinched to make them bushy. Regular syringing in summer will do a good deal towards keeping insects under, but if necessary the leaves should be syringed with an insecticide. The best are coccinea, scarlet, summer bloomer, 3 ft. high; and Duffii (macrothyrsa), scarlet, summer. Grandiflora, Fraseri, and superba are good varieties of coccinea.

J

Jacaranda (jăc-ar-ăn-da. Ord. Bignoniaceæ). The species ovalifolia or mimosaefolia is grown for its foliage as much as its blue flowers. It is a perennial and needs a warm house. Sandy peat is a suitable compost. Cuttings can be struck in such soil in heat in summer. It grows 3 to 8 ft. high, and is hardly suitable for a small structure.

Jacobaea (jăco-bāe-a. Ord. Compositæ). The Jacobaeas of seedsmen, forms of the species elegans, a South African plant with purple flowers, are Senecios; but the popular name is well-rooted. These Jacobaeas are generally offered in separate colours and also in mixture, single and double. They are grown for flower-garden use, and are generally treated as half-hardy annuals, being sown under glass in late winter, pricked off into boxes, and planted out in May. The height is about 18 ins.

Jacobaea Lily. See Amaryllis (Sprekelia) formosissima under Amaryllis.

Jacobinia (jăc-o-bĭn-ia. Ord. Acanthaceæ). Hothouse shrubs with brilliant flowers. J. chrysostephana blooms in winter, when it produces large clusters of beautiful orange-yellow flowers. Carnea (Justicia carnea) has pale rose flowers in summer. Ghiesbreghtiana has scarlet flowers in winter. All grow about 2 ft. high. Equal parts of loam and peat, with a little decayed manure and some sand, suit. Propagation is by cuttings in a propagating case.

Jacob's Ladder. See Polemonium caeruleum.

Jamesia (jāmes-ia. Ord. Saxifrageæ). The one species grown, americana, is a deciduous shrub with leaves white on the underside, producing small white terminal flowers in early summer, height 3 to 5 ft. Ordinary soil. Propagation is by cuttings inserted in sandy soil under a hand light in autumn.

Japan Cedar. See Cryptomeria.

Japanese Dwarf Trees. Considerable interest is taken in these quaint examples of Eastern art, and collections are grown in various British and American gardens. By cramping the roots and twisting the shoots, trees many years old are kept at a height of 2 or 3 ft. They are generally grown in ornamental bowls. Genuine specimens are somewhat expensive.

Japanese Quince. See Pyrus (Cydonia) japonica.

Jasione, Sheep's Scabious (jas-i-ō-ne. Ord. Campanulaceæ). The species perennis, a hardy perennial of tufted habit, with blue flowers in round, Scabious-like heads in summer, height 1 ft., is worth growing in the border or rockery. Ordinary soil. Propagation by division.

Jasmine, Jasminum (jăs-mī-num. Ord. Oleaceæ). These sweet-scented ramblers are great favourites, and one hardy species, nudiflorum (Winter Jasmine), is common in most gardens, large and small, bearing its yellow flowers during mild spells in winter when devoid of leaves. The shoots which have flowered should be pinched

back in May, when fresh ones will break, and being close to the wall, will ripen well. The pretty white warm greenhouse Jasmine, gracillimum, is also a great favourite. Grandiflorum will thrive in a cool greenhouse, and bears white flowers in late summer. Officinale is the common white hardy Jasmine. Floridum, fruticans and revolutum, all hardy with yellow flowers; also the newer hardy kinds, primulinum, yellow, probably a Chinese form of nudiflorum; and Beesianum, a red rambler from China, are also worthy of attention. The hardy Jasmines will thrive in any fertile soil; equal parts of loam, with some sand, suit the others.

Propagation. The outdoor kinds may be increased by layers or suckers, the indoor by cuttings taken off with a heel of old wood and inserted in sandy peat under a bell-glass. When the young plants begin to grow the tip should be pinched out, when side shoots will break freely. The branches should be thinned when they get crowded, and young wood cut to spurs.

Jasmine, Box. See Phillyrea.

Jasmine, Rock. See Androsace.

Jerusalem Artichoke. See Artichoke.

Jerusalem Sage. See Phlomis.

Jessamine. See Jasmine.

Job's Tears. See Coix.

Jonquil. See under Daffodils, where the best Jonquils are named.

Joss Flower. A form of Polyanthus Narcissus; see under Daffodils.

Judas Tree. See Cercis.

Juglans, Walnut (ju-glans. Ord. Juglandeæ). The Walnut, Juglans regia, is a hardy deciduous tree, thriving in any fertile soil. The nut is encased in a thick green case, which will decay after storing in autumn. See also Walnut. Propagation is by seeds for the common kind, by budding or grafting for the special varieties, of which there are several. Cathayensis is a modern species with black fruit.

Julus, Snake Millipede. The species complanatus and pulchellus guttatus are short, many-legged, quick-moving "insects," often found about the roots of plants. Soot water and brine may be used to get rid of them; or they may be trapped with pieces of Mangold.

June Berry. See Amelanchier.

Juniperus, Juniper (jū-nĭp-erus. Ord. Coniferæ). Handsome evergreens, some hardy, others requiring the shelter of a greenhouse. Good varieties are well worth growing as lawn plants. They do not care for stiff, damp soil, thriving best in light, friable ground. Propagation is by seeds or cuttings in August in a frame or under a bell-glass. Chinensis aurea and C. albo-variegata are good lawn trees. There are several good varieties of communis, the common Juniper, notably fastigiata and glauca. Virginiana is the Red Cedar, and there are many varieties of it, such as argentea, aureo-variegata, glauca (Silver Cedar), and pendula. Bermudiana, the Bermuda Cedar, must be grown in a greenhouse.

Justicia (jŭs-tĭc-ia. Ord. Acanthaceæ). This genus is closely related to Jacobinia, and in fact is incorporated with it by modern botanists, but certain species are grown in gardens under the name of Justicia. Carnea, coccinea, Ghiesbreghtiana, and magnifica are cases in point. For culture, see Jacobinia.

K

Kaffir Lily. See Schizostylis coccinea.

Kainit. A natural salt containing about 12½ per cent of potash. It is a useful fertiliser when applied in winter, but inferior as a garden potash fertiliser to sulphate of potash. See Manures.

Kalanchoe (kal-an-kō-e. Ord. Crassulaceæ). Succulent plants, with flowers on terminal heads. Flammea is a brilliant warm greenhouse species, grown for its beautiful orange flowers in spring, height about 1½ ft. It likes loam with a third of leafmould and sand. Propagation is by cuttings in sandy soil.

Kale. See Borecole and Seakale.

Kalmia (kălm-ia. Ord. Ericaceæ). Handsome hardy evergreen shrubs. The three species angustifolia, crimson; glauca, purple; and latifolia, pale pink, are all good. There are several varieties of the first and last. Height about 2 ft. Latifolia is worth growing as a foliage shrub alone, but its flowers are beautiful. They like peat, and are propagated by seeds in spring, layers in autumn, or cuttings of side shoots in summer. They all dislike lime.

Kalosanthes. See Crassula and Rochea.

Kaulfussia (kāūl-fuss-ia. Ord. Compositæ). The Kaulfussia amelloides of seedsmen is not the true plant of that name, which is a fern. Botanists call the seedsman's plant Charieis heterophylla. It is a beautiful South African annual with blue flowers, height 1 ft. It responds to treatment as a half-hardy annual. See Annuals.

Keel. The lower pair of petals in a leguminous flower, such as the Sweet Pea.

Kenilworth Ivy. See Linaria Cymbalaria.

Kentia (kent-ia. Ord. Palmæ). A genus of palms, giving us species, such as Belmoreana, Canterburyana, and Forsteriana, which are good for rooms as well as for greenhouses. For culture, see Palms. Botanists now refer the first and last to the genus Howea, and Canterburyana to Hedyscepe.

Kerria (kĕr-ria. Ord. Rosaceæ). Japonica is a useful dwarf yellow-flowered deciduous shrub, thriving in almost any soil, and blooming profusely in late spring; height 8 to 12 ft. Corchorus japonicus is the same thing. The double, flore pleno, is more popular than the single. They may be grown in the shrubbery, but are better on walls or fences. Propagation is by division in autumn or spring, or by cuttings of young shoots under a hand light. Pruning may consist of cutting out crowded shoots. The plants may be forced in pots if desired. Plant in autumn or spring.

Kidney Bean. See Bean.

Killarney Fern. See Hymenophyllum.

King's Star. See Amaryllis.

Kirengeshoma (kĭ-renge-hō-ma. Ord. Saxifrageæ). The species

palmata is a hardy Japanese perennial, with drooping bell-shaped yellow flowers, height 3 to 4 ft. It likes loam and peat in a shady spot. Propagation is by division in spring.

KITCHEN GARDENS: CULTIVATION AND CROPPING

A well-managed kitchen garden is a source of much benefit to the household, as a constant supply of delicious and wholesome vegetables can be provided. It will contain not only an adequate supply of the table vegetables which are most appreciated, but also plenty of fresh salads and a sufficiency of herbs. In large kitchen gardens fruit is generally associated with vegetables, trees being grown alongside the paths, and also on the walls. The fruit and plant houses are generally put in the kitchen garden. In very small establishments, where the space for vegetables is limited in area and is near the house, it may be well to omit the coarser winter Greens, partly because they take up room which could be better devoted to choice things, such as Asparagus, Seakale, Celery, Cauliflowers, spring Cabbages, and salads; and partly because their odour is disagreeable in wet weather. Where there is a fair amount of ground available, the kitchen garden may be separated from the house by flower gardens and shrubberies. Shelter of some kind is desirable. A high, strong wall is the best, not only because of the complete shelter which it provides, but also because it is capable of supporting lean-to and hip-roofed greenhouses, vineries, and other glass structures, besides fruit trees. Moreover, wide borders can be made on the inner side, and those with south and west aspects will be favourable for early crops. Failing the wall, there must be a hedge of Quick, Privet, Hornbeam, or Beech; or a fence.

Paths. Substantial paths are desirable, and the best are made with 6 ins. of rubble well rammed in with clinkers and surfaced with 2 ins. of gravel. They should slope from centre to sides to carry off water.

Soil. The soil should be cultivated deeply and manured liberally. An excellent plan is to take one strip at a time and bastard-trench it, that is, take off the top soil to the full depth of a spade, break up the soil underneath to the depth of a spade or fork, put on manure and any garden refuse, and replace the top soil. In the case of light land this may be done in autumn if convenient; in the case of heavy land, in winter after frost. See Bastard-trenching and Digging. If the soil is stiff and the site low, it ought to be drained (see Drainage). The top soil may be left lumpy so that late frost may crumble it. It can then be raked down fine for sowing in spring.

Manure. Decayed stable or yard manure at the rate of two barrow-loads per square rod, or 30 loads per acre, will be good. Light, shallow, dry soil is improved by green manuring, that is, sowing Mustard at the rate of 2 oz. per square rod on ground that becomes vacant in summer, and digging it in during autumn. See also Manures.

Cropping. Many gardeners arrange for a rotation of the annual crops, using different crops on one piece of ground in successive years. It is feasible to have a perfect four-course rotation if the different classes are grown in the same quantities, but not if one

class is grown in much larger proportions than another. Given equal proportions the following might follow each other in successive years: (1) Potatoes; (2) Peas, Beans, Celery, and Leeks; (3) Beetroot, Carrots, Parsnips, Salsify, and Scorzonera; (4) Greens and Onions. A tap-rooted crop is a good succession to a fibrous-rooted one. Ground may be heavily manured for Peas, Beans, Celery, Leeks, Greens, and Onions, but not for Potatoes, Beetroot, Carrots, Parsnips, and Tomatoes. Intensive culture provides for quick successions of vegetables, and may be considered in connection with French Gardening (which see). See also remarks under Vegetables.

Special remarks on the culture of all the principal vegetables, salads, and herbs are given in alphabetical order in this work. See Artichoke, Asparagus, and so on.

Kniphofia, Flame Flower, Red-hot Poker, Torch Lily (knī-phō-fia. Ord. Liliaceæ). One of our noblest hardy herbaceous plants, splendid for making bold groups. The leaves are long and arching, and the flowers are borne in the form of a cone on a long, stiff stem. The prevailing colours are yellow, orange, and red. They form thickened rootstocks, and need careful division in spring if propagation is required, but plants may be raised from seed in spring. In rich, loamy soil magnificent plants are produced, but they will thrive on well-drained clay, and even on chalk if well watered in dry spells until established. Special sites should be chosen for them, in order to get fine colour effects. The leaves may be tied over the crowns in autumn to throw off rain.

Principal Species and Varieties. The following are the principal sorts: aloides (Tritoma uvaria), the common Flame Flower; there are several good named varieties or hybrids, such as Franz Buchner, nobilis, Obelisque, Pfitzeri, Saundersii, and Star of Baden-Baden. Corallina and its variety superba are dwarf growers. Leichtlini has red and yellow flowers, height about 4 ft. Macowani is a dwarf species with coral flowers. Rooperi, orange and yellow, 2 ft. high, and Tuckii, red and yellow, are good. Longicollis (primulina) is a greenhouse species with pale yellow flowers. Kniphofia is synonymous with Tritoma.

Knot Grass, Knot Weed. See Polygonum.

Kochia (kō-chia. Ord. Chenopodiaceæ). The species tricophylla (scoparia) is an uncommon hardy annual, forming a symmetrical bush of soft green, fern-like foliage in summer, which turns deep red in autumn. This is used in flower-beds and borders. It is not particular as to soil, but does not care for dry chalk. Grow as a half-hardy annual. See Annuals.

Kohl-rabi. Generally regarded as a farm crop, the Kohl-rabi is well worth growing in gardens, and needs the same treatment as Cabbages. Earliest Purple and Earliest White are good varieties. Kohl-rabi makes a good substitute for Turnips, and has the advantage of not running to seed.

Kolreuteria (kol-reu-tē-ria. Ord. Sapindaceæ). The species paniculata is a very beautiful Chinese tree growing 12 to 15 ft. high, with feathery foliage, the leaflets deeply toothed, and long terminal spikes of yellow flowers in summer, followed in dry seasons by an inflated capsule. An expert has prophesied that in due time it will rival the

Laburnum in popularity. It is at its best in friable loamy soil in a sheltered position. Propagation is by cuttings in spring or layers in autumn. The cuttings should be inserted in sandy soil under a hand light.

Kolwitzia (kol-wĭt-zia. Ord. Caprifoliaceæ). The species amabilis is a beautiful hardy Chinese shrub of modern introduction, with pink, yellow-throated flowers, followed by fruits garnished with brown bristles. Unfortunately, it is somewhat erratic, failing to flower for no obvious reason in some districts. Further experience with the plant is required.

Königa (kŏn-i-ga. Ord. Cruciferæ). The plant often sold as Königa maritima is the same as the common "annual" (really perennial) Alyssum maritimum, which see. There is a variegated form, about 4 ins. high, good for edgings, which is sold by florists in boxes in spring under the name Königa variegata. This is best propagated by cuttings.

L

Labels. Labels are perhaps an evil, but they are a necessary evil in gardens. They should be as inconspicuous as possible. Plain wooden labels, the upper part touched with white paint to take the impress of the pencil, are the commonest kind, and are cheap and handy. They do not last long unless the lower part is soaked in creosote, Stockholm tar, or some other preservative. Wooden labels may be thinly coated with white paint, then brushed over with methylated spirit and written on with Indian ink. Zinc labels, with indelible ink, are suitable for many purposes. For large permanent labels, metal tallies with the name stamped in bold raised letters should be used. Celluloid labels are good and cheap. Labels wired on to young trees should be examined to see that the shoot is not growing round the wire.

Laburnum (lă-bûr-num. Ord. Leguminosæ). Useful deciduous trees, generally grown as standards, and bearing abundance of long, drooping racemes of yellow flowers in spring. The Scotch, alpinum, is better than the common. The genus was once included with Cytisus, the common Laburnum being known as Cytisus Laburnum. It is now Laburnum vulgare. There are several varieties, such as grandiflorum, large, late; aureum, yellow-leaved; pendulum, weeping; Oak-leaved, quercifolium; and the fine Alschingeri. There are several varieties of the Scotch, Parksii and Watereri being good. Laburnums thrive in almost any kind of soil, from chalk to clay, and do not object to banks. They will do in towns. They should be planted in autumn or late winter, and staked securely.

Propagation. This may be by seeds, which are poisonous; but budding and grafting are practised in the nurseries. Apropos of grafting, one of the most interesting of the Laburnums is Adami (Cytisus Adami), with purple flowers, which resulted from grafting Cytisus purpureus on the common Laburnum; several shoots grew from the graft, and the most vigorous one, propagated separately, gave all the plants now known as C. Adami. Some specimens give a peculiar example of reversion, for one bud on a tree will give the yellow Laburnum, while others on the same tree revert to the purple parent. In other trees the hybrid remains fixed. Both species are fertile, but the hybrid itself is sterile. This has been considered a graft-hybrid, but botanists now describe it as a "chimera," or dual plant, the body being the yellow Laburnum, and the skin the purple.

Lachenalia (lack-en-ā-lia. Ord. Liliaceæ). Pretty, graceful, free-blooming bulbs, suited for pot culture, and also for hanging baskets. Five bulbs could be put in a 6-in. pot, or several 2 ins. apart round the sides of a wire basket lined with moss and filled with bulb soil (see Bulbs). They are charming for cool greenhouses, flowering late in spring. The most popular kinds are pendula, red, green, and purple; Nelsoni, yellow; and tricolor, yellow, green, and red.

Lackey Moth Caterpillar. A not uncommon enemy of Apple and other trees. The eggs are laid by the moth round the young shoots in gummed rings. The caterpillars are large, gay in colour, and live in web nests. The sprays recommended under Apples are good preventives. Bands of eggs and web nests should be destroyed when seen.

Lactuca, Lettuce (lăc-tū-ca. Ord. Compositæ). See Lettuce.

Ladybird. This pretty creature should be treated as a friend of the gardener, inasmuch as it preys on aphides.

Lady Fern. See Asplenium filix-foemina.

Lady's Ear-drops. See Fuchsia.

Lady's Slipper. See Cypripedium.

Lady-Smock. See Cardamine pratensis.

Laelia (lāē-lia. Ord. Orchidaceæ). Beautiful hothouse epiphytal Orchids, resembling Cattleyas, with which they have been crossed. The cultural remarks made under Cattleya apply to them. See Cattleya. The following are the principal sorts: anceps, winter bloomer, and its varieties; autumnalis, winter, various colours, sweet; cinnabarina, cinnabar, spring; Perrinii, winter, red and white; pumila, autumn, various colours; purpurata, late spring, purple, etc.; several varieties; and tenebrosa, late spring, brown and purple. There are many hybrids between the above species, also bigeneric hybrids between Laelias and Cattleyas; and trigeneric hybrids between Laelias, Cattleyas, and Brassias. For these a modern work on Orchids should be consulted, as they are counted by scores, and the descriptions are highly technical.

Laelio-Cattleya. See Laelia above.

Lagurus (lă-gū-rus. Ord. Gramineæ). The species ovatus is the Hare's-tail Grass. For culture, see Annuals: Ornamental Grasses.

Lamb's Ear. See Stachys lanata.

Lamb's Lettuce. See Corm Salad.

Lamium, Dead Nettle (lā-mium. Ord. Labiatæ). The species maculatum is the only one grown to any extent. Height 1 ft. It thrives in ordinary soil, and is propagated by division in spring, or cuttings.

Lantana (lan-tā-na. Ord. Verbeniaceæ). Pretty dwarf shrubs (1 ft.), suitable for the greenhouse and for bedding in summer. The foliage resembles that of Heliotrope, and the flowers are in Verbena-like heads. They thrive in ordinary soil, and are propagated by cuttings of young wood under glass in summer. The species are not much grown, the majority of people preferring garden varieties. Salvifolia (violacea), which has mauve flowers and a purple-tinted leaf, height 3 ft., is a good plant for summer bedding, and may also be used for winter blooming in a warm greenhouse.

Lapageria (lăpa-gē-ria. Ord. Liliaceæ). The species rosea is one of the best of all indoor climbers, as in addition to marked vigour of growth it produces large quantities of very beautiful drooping tubular flowers of a bright rose colour in early summer. The white variety, albiflora or alba, is also beautiful. Lapagerias are suitable for rambling on the roof of a large cool glass-house, and if planted out in well-drained peat, and kept safe from frost, they will thrive. They are not at home in pots. Propagation is by layers. Prune by cutting out old-flowered shoots, and any weak growths. The house

should be fumigated frequently with X L ALL or other approved insecticide to keep the plants free from insects.

Lapeyrousia (lā-pey-rōu-sia. Ord. Irideæ). Pretty bulbous plants, not perfectly hardy, but succeeding outdoors in friable soil in a warm situation if the bulbs are planted deeply (6 ins.) in autumn. The principal species are corymbosa, with violet flowers in spring, height 6 ins.; and grandiflora, red with deeper blotches, 1 ft. Cruenta is the same as Anomatheca cruenta, which see. Propagation is by offsets while the plants are dormant.

Larch (Larix europaea. Ord. Coniferæ). One of the most extensively planted of hardy deciduous Conifers for economic purposes, but hardly good enough to displace certain other Conifers in gardens. It looks its best when the new leaves break in spring. No particular compost is needed. Propagation is by seeds; the seedlings must be transplanted early, or the roots will not be fibrous. Larch poles with the lower part unbarked or else peeled and dressed with tar or creosote are good for arches, pillars, and pergolas (see Flower Gardens). There are several varieties of the common Larch, such as glauca, pendula, and sibirica. Larix pendula is the Black Larch.

Lardizabala (lār-di-zăb-a-la. Ord. Berberideæ). The only species is biternata, a Chilian evergreen climber with glossy leaves and purple flowers in autumn. Not being perfectly hardy, it is best grown on a sheltered wall in a compost of fibrous loam and peat. Propagation is by cuttings in sandy soil under a hand light in summer, or by seeds. Plant in spring.

Larkspur. The popular annual Larkspurs are Delphiniums, and as we see under Delphiniums, there are two types, the Rocket, about 1 ft. high; and the Branching, about 2 ft. high. Seedsmen offer seeds of Stock-flowered, and Hyacinth-flowered Larkspurs in several colours, and in mixture, and they may be sown outside in spring and the seedlings thinned (see Annuals). Florists often raise special varieties, such as the Stock-flowered rose, in boxes for sale in May, treating them as half-hardy annuals. See also Delphinium.

Larva. A caterpillar, grub, or maggot. The principal kinds are dealt with under the plants which they infest.

Lasthenia (las-thē-nia. Ord. Compositæ). The species californica (glabra) offered by seedsmen is a hardy annual with yellow flowers in early summer, height 1 ft. Sow outside in spring and thin. Ordinary soil.

Lastraea. This genus of ferns is now allied to Nephrodium by botanists, with the exception of aristata, which is called Aspidium aristatum. Filix-mas is the famous Male Fern, of which there are many varieties. It is a hardy species, as also is dilatata. See Ferns, also Nephrodium.

Latania, Bourbon Palm (lă-tă-nia. Ord. Palmæ). Latania borbonica, one of our handsomest room and conservatory palms, has broad fronds. Botanists now call it Livistona chinensis. For culture, see Palms.

Laterals. A term applied to the side shoots of Grape vines, but equally applicable to the side shoots of other plants. See remarks under the pruning of Apple and other fruit trees, Grape vines, etc.

Latex. A milky fluid present in many plants, generally white as in Lettuces, but red in Sanguinaria.

Lathyrus (lăth-y-rus. Ord. Leguminosæ). The principal members of

this genus are the Sweet Pea, odoratus (see Sweet Peas), and the Everlasting Pea, latifolius or sylvestris platyphyllus (see Everlasting Pea). Sativus is the dwarf annual Chickling Vetch, the blue form of which is often erroneously called Lord Anson's Pea, and seed of it is sold as such. Magellanicus (nervosus) is the true Lord Anson's Pea, and is a deciduous perennial, like the Everlasting Pea. It was flowering in a greenhouse at Kew in 1927. The standard was purplish blue, the wings and keel white, tinted blue. The flowers were scented. Tingitanus, an annual, with purple flowers; Drummondii, a brownish-red perennial, 8 flowers per spray: grandiflorus, a rose perennial; and rotundifolius, a rose perennial, are sometimes grown. They are all hardy, and increased by seeds or root division in spring. Any good soil suits.

Lattice-leaf Plant. See Ouvirandra fenestralis.

Laurel. That popular evergreen the common or Cherry Laurel is the Prunus laurocerasus of botanists; caucasica, colchica, and latifolia, are garden forms of it. A rapid grower, and succeeding on almost any soil, it is very useful for forming screens and shelters quickly. Young plants should be planted between November and April, and they may be put 6 to 9 ft. apart according to the fertility of the soil; the richer it is the more room they should have.

Pruning. This should be done with judgment, and except where large areas have to be dealt with, as in the case of a long and high Laurel hedge where time is an important consideration, the knife should be preferred to the shears, as fewer stumps are left exposed. The pruning should be started while the hedge is quite young. When old plants are shifted they sometimes lose their leaves, but they usually break again from the old wood and are soon green. The Laurels may be propagated by cuttings and layers if desired, but they are so cheap that it is hardly worth while to raise stock at home.

Various Laurels. The Portugal Laurel, P. lusitanicus, has narrow leaves. The Sheep, or American Laurel, is Kalmia angustifolia. The Aucuba is sometimes called the Variegated Laurel. The Alexandrian Laurel is Danae Laurus (Ruscus racemosus). The Bay Laurel is Laurus nobilis (see below). The Ground Laurel, or Mayflower, is Epigaea repens. The Spurge Laurel is Daphne Laureola. See the various plants named. Plant in autumn or spring.

Laurestinus or **Laurustinus.** This useful evergreen is the Viburnum Tinus of botanists. Of compact habit, not growing quickly to an unwieldy size, with handsome leaves and pretty whitish flowers (red while in bud), in winter and spring, cheap, easily transplanted between November and April inclusive, thriving in most soils, and at home in shade, it is a very useful shrub, and should always be chosen where inexpensive evergreens are wanted. Plant 8 ft. apart in autumn or spring.

Laurus nobilis, Sweet Bay (lāu-rus. Ord. Laurineæ). This handsome tree is well worth growing, and it thrives in fertile, loamy soil. Propagation is by cuttings in a greenhouse in September, or by seeds sown when ripe. The leaves are aromatic, and the flowers, which are yellow and borne in spring, are followed by purple berries. Angustifolia is a narrow-leaved variety. In cold districts plant in a sheltered place, in autumn or spring.

Lavatera, Rose Mallow (lăva-tē-ra. Ord. Malvaceæ). The most

valuable of the Rose Mallows are the hardy annual rosea splendens and its white variety; the former makes a large bush in summer from spring-sown seed, and bears a profusion of beautiful pink flowers, which last well. The Rose Mallows should be sown outside in spring and the young plants thinned to 2 ft. apart. The height is 3 to 4 ft. Arborea variegata, the variegated Tree Mallow, is a handsome shrub, but not quite hardy. Olbia, purplish red, and its form rosea, are also shrubs with woolly leaves. Plant in autumn or spring.

Lavender, Lavandula (lăvan-dūla. Ord. Labiatæ). The common Lavender, vera or spica, is a familiar shrub, with its greyish leaves and perfumed flowers. It will thrive on most soils and has a partiality for chalk. Propagation is by cuttings of side shoots in late summer in a cold frame. Plant in autumn or spring. The flowers are generally ready for use about midsummer, when, being open, they can be gathered, hung up in bunches in a dry, cool place, and so dried. Nana and nana alba are dwarf forms of vera suitable for the rockery. Plant in autumn or spring.

Lavender Cotton or French Lavender. See Santolina.

Lavender, Sea. See Statice.

Law. The following are a few points of law as affecting horticulturists: (1) A professional gardener is a domestic servant. He is entitled to a month's notice, but may be summarily dismissed for wilful misconduct. (2) Trees and shrubs planted by a tenant hiring freehold property may not be removed without the consent of the owner, which should be obtained on taking up the tenancy. Such consent is not necessary in trade establishments. (3) Greenhouses nailed to walls and attached to mortared bricks may not be removed by tenants without consent, unless used for trade purposes; if, however, erected in sections on loose bricks, and attached by screws, they may be removed. (4) Trees hanging over from a neighbour's ground may be cut if the owner refuses to deal with them. Fallen fruit may not, however, be appropriated; the owner has right of access to pick it up if it is not delivered voluntarily, but is liable to be sued at law if he does any damage during collection. (5) Poultry and animals trespassing on another property may not be killed, but the owner is liable for any damage which they may do.

Lawns. No garden looks perfect without well-kept grass, and flower-lovers must not allow their passion for plants to cause neglect of the turf. It is common nowadays to plant bulbs in grass, and very charming the flowers are in spring (see Bulbs). This accustoms the eye to seeing a certain amount of rough grass; but that is no reason why the tennis lawn, the broad grass paths round herbaceous borders, the narrower strips along drives, and pieces of turf near the house, should be neglected. On the contrary, they should be mown and rolled from the time that the grass begins to grow in spring.

Seed and Turf. Under Grass (which see) readers are reminded that lawns may be made by sowing seed in September or April (the former for preference): and by laying turf at any time between October and March (April in some seasons) inclusive. Weeds should be spudded out, or treated with lawn sand or sulphate of ammonia. A small quantity of Clover seed may be added to mixtures of grass seeds (see Grass) for ordinary lawns if desired, but should not be used for tennis lawns, bowling greens, or other games areas. Lawns

are benefited by being scratched or pricked over in late winter or early spring, as the aeration thus effected is beneficial to the young grass.

Rolling and Mowing. The principal rolling should be done in spring, and followed up during moist spells during summer. Mowing will probably be needed at least once a week between April and October inclusive. If possible, grass should not be mown while it is very wet, but if that is unavoidable, a light roller should be run over it first. If the lawn is free from weeds, a grass-box need not be used, at all events constantly; but if there are flowering weeds the mowings should be caught and removed. The edges of the grass should be neatly trimmed with sharp edging shears.

For hints on suitable kinds and quantities of grasses for tennis lawns and other lawns, for getting rid of moss, for renovating, and other matters, see Grass.

Layering. A method of propagation practised with Quince and Paradise stocks for fruit trees, with many trees and shrubs, and with Carnations. Shrubby plants with low, spreading branches lend themselves to layering. The process consists in drawing a portion of the branch down to the ground, pegging it, and covering the point of contact with soil. It is generally done late in summer. In the case of Carnations, a slit is made in the stem, but this is not done with most shrubs, which root from the bark. They are best left a year before being severed. Carnations are ready in a few weeks. A layer has no tap root, and this is an advantage with trees and shrubs, as well as with fruit stocks (see Apples and Fruit).

Layia (lāy-ĭa. Ord. Compositæ). The species elegans (Oxyura elegans) is a Californian annual growing about 1 ft. high, with glaucous lance-shaped leaves and yellow ray florets edged with white. Seed may be sown outside in May, preferably in a sunny place and in friable soil.

Leadwort. See Plumbago,

Leafmould. A valuable ingredient of potting composts, formed of decayed leaves. As a rule, from a third to a fourth is a suitable proportion, the bulk of the compost being loam. A larger proportion may be used for propagation, as leafmould, with sand, encourages root production. The effect of leafmould is to lighten soil, and it is a good addition to stiff land.

Leatherjacket. The grub of the crane fly, Tipula oleracea. It may be reduced by dressing the ground with Vaporite, Apterite, or similar substance, in spring. Baits of Potato or Mangold should be put near valuable plants, such as choice Carnations, and examined regularly.

Ledum, Labrador Tea (lē-dum. Ord. Ericaceæ). Hardy evergreen shrubs with white flowers in spring and early summer. Glandulosum, 1½ ft.; latifolium, 3 ft., with its varieties canadense and globosum; and palustre, 2 ft., with its trailing form decumbens, are the principal species. The Ledums are handsome Heathworts, thriving in sandy peat, and propagated by layers in autumn. Plant in autumn or spring.

Leek (Allium porrum. Ord. Liliaceæ). The popularity of the Leek tends to spread southward, and it is becoming as great a favourite with English as it has long been with Scotch gardeners. Its advantages are threefold: it is easily grown, it is suitable for following early

crops, it is hardy. It answers well under Celery culture, and fine specimens are obtained by sowing under glass and planting in trenches; but useful table produce is secured by sowing out of doors on a spare plot in spring and planting 1 ft. apart with a dibble in June. This invaluable vegetable is so hardy that it need never see glass, but it is handy to have a box of seedlings ready for planting out at any time in spring or summer, and we therefore generally raise a batch in an unheated frame, putting the box outside before April is out and giving the plants a watering now and then. It must be earthed if white stems are wanted. The crop may be left in the ground unprotected in winter. Good varieties: Musselburgh, The Lyon, Prizetaker.

Legumes or **Leguminous Crops.** A legume is a pod (fruit) which opens on both sides. See Beans, Peas, etc.

Leiophyllum, Sand Myrtle (lēe-ō-phyllum. Ord. Ericaceæ). The only species much grown is buxifolium, a hardy evergreen shrub with shining oval leaves and white flowers in late spring or early summer, height 4–12 ins.; there is a low form of it called prostratum. Like other Heathworts, it enjoys peat. Propagation is by layers in autumn. Plant in autumn or spring.

Lemon-scented Verbena. See Lippia citriodora.

Lenten Rose. See Helleborus.

Lent Lily. See Daffodil.

Leontopodium. See Edelweiss.

Leopard's Bane. See Doronicum.

Lepidium Draba. The " devil's cabbage " of Kent (Thanet). It is one of the worst of weeds. It can be destroyed with copper sulphate, ½ lb. per gallon of water.

Leptosiphon (lĕp-tō-sī-phon. Ord. Polemoniaceæ). Charming hardy annuals. Densiflorus and its white variety are particularly good. For culture, see Annuals. Modern botanists refer the genus to Gilia, but it is kept separate in gardens.

Leptospermum, Manuka (lep-tos-pēr-mum. Ord. Myrtaceæ). The only species much grown is scoparium, a half-hardy shrub with lilac flowers in winter, height 3 to 4 ft. The variety Nicholli, with tinted leaves and beautiful carmine flowers, is worthy of consideration. Lanigerum is distinguished by its woolly leaves and white flowers; it blooms in summer. The Leptospermums should have a sheltered place when grown outdoors, with a compost of peat, loam, and sand. Propagation is by cuttings under a handlight in summer. Plant in autumn.

Leptosyne (lep-tō-sȳ-ne. Ord. Compositæ). The only species commonly offered by seedsmen is maritima, an American perennial which is generally treated as a half-hardy annual, the seed being sown in heat in spring, the seedlings pricked-off, hardened, and planted out in May. It produces large yellow and orange flowers late in summer; height about 1 ft. Ordinary soil.

Lespedeza (les-pe-dē-za. Ord. Leguminosæ). A small genus of deciduous shrubs with feathery leaves. The species most grown is bicolor, purple and rose, 4 to 5 ft. high, flowering early in autumn. Sieboldi, blue and purple, 3 to 4 ft., is by nature a shrub, but it is generally checked in winter and has to throw up fresh growth, thereby in practice becoming herbaceous. These shrubs do best

in sandy peat in a sheltered place. Propagation is by cuttings in sandy soil under a bell-glass in summer. Plant in autumn or spring.

Lettuce (Lactuca sativa. Ord. Compositæ). The most popular of all salads. With the number of good varieties now available there is no difficulty in getting a long supply of crisp, nutty Lettuce over the greater part of the year. The plant will grow in almost any soil that is reasonably fertile, and nice hearts may often be obtained from ground that would otherwise be wasted space, between Pea rows, for example, or on the ridges of soil that result from making Celery trenches.

"*Bolting*." The one serious trouble with Lettuces is what gardeners term " bolting," that is, running to seed prematurely. This spoils the plant for edible purposes. It is more common with the upright (Cos) varieties than with the dwarf (Cabbage) section, and a reliable, non-bolting variety, such as Favourite or Continuity, should always be grown as a stand-by. However, there is not, as a rule, much trouble from bolting with the Cos sorts if they are grown unchecked from the first, put out in moist soil, and used young. " Bolting " is known by the plants throwing up a shoot from the centre instead of remaining firm. It is useless to keep plants which betray this weakness, but those who like cooked Lettuces need not waste them, even though they may have no pets, such as rabbits, to feed. A light coat of bone flour or superphosphate, say 4 oz. per square yard, spread on and forked in before planting, will help them to form hearts. The ground should be dug deeply, and a dressing of decayed manure turned in during the process.

Sowing. The first sowing of seed may be made in a cool house or frame in winter. If Lettuce is in great demand, and there is a frame or pit available, the seed may be sprinkled over it broadcast, and the plants thinned to a few inches apart. When they have grown a little, some may be drawn unhearted and used, while the others are left to mature. Otherwise, the seed may be sown thinly in boxes, and the plants put out in April. Seed may be sown outdoors on a warm border early in March, but in exposed places the end of the month will be early enough for safety. The soil should be dug, crumbled, raked fine, and drills drawn 1 ft. apart and about ½ in. deep. The seed germinates quickly if the ground is moist, but not sodden, at sowing time. If the seedlings come quickly they should be thinned, and when the plants begin to crowd each other again they should be planted out 1 ft. apart after showery weather; very large varieties, like Giant White Cos, may be given more room.

Where Lettuces are in great demand it is well to sow little and often, so as to maintain a regular supply of young plants, some of which will always be hearting in. To make one or two large sowings with the object of maintaining a regular supply is a bad practice, as the plants come in together in large quantities and will not keep. A final sowing may be made outdoors about mid-August. The plants thus raised will be set out 1 ft. apart in autumn to stand the winter, which they will do in most years if a hardy variety is chosen.

Blanching. When the plants are fully grown the hearts should be blanched by tying the outer leaves up just above the centre with a strip of raphia. They should be tied firmly, but not drawn tightly, or the hearts may rot.

Varieties. Paris White and Giant White are two reliable Cos

varieties, with Hicks's Hardy white and Black-seeded Bath to sow in August. Favourite and Continuity are splendid Cabbage varieties. Those who force Lettuces (see also French Gardening) should note the following sorts: Romaine Cos, Acquisition Cabbage, and Improved Chavigny Cabbage. Noire Parisienne is also good.

For Lamb's Lettuce see Corn Salad.

Leucocrinum (leu-co-crī-num. Ord. Liliaceæ). The only species grown is montanum, a rare hardy herbaceous perennial with white flowers. It should be grown in loam and leafmould, with sand. Propagation is by offsets while the plants are dormant. Plant in autumn or spring.

Leucojum, Snowflake (lēu-cō-jum. Ord. Amaryllideæ). These pretty hardy bulbs rival the Snowdrops in charm. The species aestivum is the Summer Snowflake and vernum the Spring Snowflake; the 2-flowered form of the latter called Vageneri or biflorum is very beautiful, as is carpathicum. All the above have white flowers tipped with green, but in carpathicum the edge is yellow; there are 2 or 3 flowers per stem. Plant a few inches apart in colonies in autumn. For propagation take the offsets in summer.

Leucothoe (lēū-co-thō-ē. Ord. Ericaceæ). These evergreen shrubs are closely allied to Andromedas, in fact the best species, such as axillaris, Catesbaei and recurva, all with white flowers, are now classed with Andromedas by botanists. Davisiae (Lobbii) is a good Californian species with white flowers in spring, height 3 to 4 ft. Sandy peat and leafmould form a suitable compost. Propagation is by layers or division in autumn. Plant in autumn or spring.

Lewisia (lēw-is-ia. Ord. Portulaceæ). Hardy plants, suitable for the rockery, and thriving in dry, sunny spots if given a compost of loam, leafmould, and sand. They are propagated by division or seeds in spring. Rediviva is a very interesting plant, growing about 4 ins. high, and with rose flowers in summer. It owes its name to its habit of reviving after apparently dying after flowering. Tweedyi has pink flowers in August. Howelli, rose; Cotyledon, rose; and Finchii, pink, are other pretty species. These plants are among the gems of the Alpine house at Wisley, Surrey.

Leycesteria (lēyces-tēr-ia. Ord. Caprifoliaceæ). Formosa, a hardy deciduous shrub, is the only species grown. Height 4 ft. It produces its purple and white flowers in summer, is not particular as to soil, and may be propagated by cuttings of ripe wood in autumn or young wood in spring, under a bell-glass. It does well by the sea. A variegated form is obtainable. Plant in autumn or spring.

Liatris, Blazing Star (lī-ā-tris. Ord. Compositæ). Hardy herbaceous plants, thriving in light soil, and propagated by division in spring, or by seeds in a greenhouse or frame. Pycnostachya is the most popular species; it bears purple flowers on spikes about 4 ft. high in late summer. Spicata, purple, 5 ft.; and graminifolia dubia, purplish rose, 4 ft., are also grown.

Libertia (lī-bēr-tia. Ord. Irideæ). Useful plants for the border or rockery, flowering late in spring. They like light, friable soil, and a covering of litter or ashes in winter. Propagation is by division or seeds in spring. Formosa, 1½ ft.; grandiflora, 3 ft.; and ixioides, 3 ft., all with white flowers in late spring or early summer, are good. Paniculata, 1½ ft., also with white flowers, is pretty, but more tender.

Libocedrus, Incense Cedar (lībō-cē-drus. Ord. Coniferæ). A small genus of evergreen Conifers, the most popular species of which is decurrens, a tall, slender, and beautiful tree. It likes a well-drained, loamy soil. Propagation is by seeds, sown when ripe in a greenhouse or frame; and by cuttings in summer. Aureo-variegata, yellow leaves; and compacta glauca, are varieties. Plant in autumn or spring.

Libonia (lī-bō-nia. Ord. Acanthaceæ). A useful hothouse genus, flowering in winter. Loam with a third of leafmould and some sand suits. Propagation is by cuttings beneath a bell-glass in spring. Floribunda, 2 ft. high, yellow, is the popular species.

Lichens. As symbiotic combinations of fungi and algae, lichens are interesting items in plant life, but when present, with mosses, on fruit trees, the lichens are out of place. They are less common on trees growing in well-drained soil than on those in damp ground. Old orchard trees are often badly infested. The bark can be cleaned by spraying the trees in winter with 1 lb. of caustic soda and 1 lb. of commercial potash, each mixed separately in tubs containing 5 gallons of water, then put together. Gloves should be worn.

Ligustrum, Privet (lī-gŭs-trum. Ord. Oleaceæ). The popular evergreen hedge plant known as oval-leaved Privet is Ligustrum ovalifolium (see Hedges); the Golden Privet is a form of it. The genus is a large one, but not of great importance save for the Privet, although such species as coriaceum, japonicum (Sieboldi), and its large form macrophyllum, and lucidum, and its beautiful form tricolor, are worth planting in large shrubberies. Henryi and Delavayanum are good evergreens of modern introduction.

Lilac, Syringa (sĕ-rĭn-ga. Ord. Oleaceæ). The common Lilac is one of the best of small flowering trees, and every lover of this fragrant old favourite should try to add a few selected varieties to his shrubbery. There are several which have finer flowers than the common Lilac, while retaining its fragrance. Of such are:

Charles X, lilac	Marie Legraye, single white
Delphine, lavender	Rubra de Marly, red
Madame Lemoine, double white	Souvenir de Louis Späth, deep lilac

These may be planted in autumn or spring, preferably in deep, loamy soil, but they are not fastidious so long as the soil is not downright poor. Persica is the Persian and vulgaris the common Lilac. Hardy as the Lilac is, it may suffer to the extent of not blooming in cold springs if planted in a draughty spot.

Forcing. Lilacs are also grown in pots for forcing into early bloom, and for this purpose the variety Charles X is much used. Small plants may be potted up into 7-in. or 8-in. in autumn, in a compost of loam and leafmould.

Propagation. Principally by cuttings and grafting. Suckers may be removed from the base in autumn, and may be planted out if stock is wanted. Or cuttings of ripe shoots may be inserted outside in autumn.

Pruning. This may form a part of the gathering, the flower-stems being cut just above points where buds nestle in the axils of the leaves, these buds developing into flowering shoots the following year. See also Syringa.

Lilium, Lily (lĭl-ium. Ord. Liliaceæ). A large and very important genus, giving us beautiful plants for conservatory, greenhouse, and garden; and exquisite flowers for wreaths and for table and church decoration. The Liliums are true bulbs, and under pot culture thrive in loam, with a third each of peat and leafmould, with sand. The only real difference in culture between Liliums and Hyacinths, for example, is that as the former have a habit of producing roots above the bulb, at the lower part of the stem, it is desirable to place the bulbs rather low in the pots, and give a top-dressing of soil when the stem roots appear. Otherwise they may be treated like Hyacinths. They also do well in bowls or pots of peat-moss fibre and shell. When used for garden decoration, Liliums should be given sheltered places. The soil should be well drained, and if stiff, lightened with road scrapings, leafmould, peat, and sand. They may be covered twice their own depth.

Varieties for Pot Culture. The most popular are speciosum (lancifolium) Kraetzeri, white; speciosum roseum and rubrum, white spotted with pink or red; longiflorum, white; and longiflorum Harrisii, white.

Kinds for the Garden. The most popular are auratum, the Golden-rayed Japanese Lily, and its varieties rubro-vittatum, virginale, and Wittei, 6 ft.; candidum, the white Garden or Madonna Lily, and its double variety, 4 ft.; Chalcedonicum, the scarlet Turk's cap, 3 ft.; croceum, the Orange Lily, 2 ft.; Martagon, purple, and its white variety, 3 ft.; tigrinum, the Tiger Lily, and its varieties Fortunei and splendens, 4–5 ft. From 3 to 6 bulbs planted 1 ft. apart in groups look well. Candidum ought to be bought towards the end of summer, the others in autumn or spring. Other good Liliums for outdoors are giganteum, pure white flowers, likes a cool, moist place, 8–10 ft.; Henryi, orange, 4–6 ft.; pomponium, scarlet, 2 ft.; pyrenaicum, the yellow Turk's cap, 2 ft.; sulphureum, pale yellow, 4–5 ft.; rubellum, red, good under trees at Wisley and elsewhere, 1½ ft.; Krameri, pink fragrant flowers, also likes some shade, 2 ft.; bulbiferum, crimson, forms bulbils in the axils of the leaves, 3 ft.; Brownii, white, suffused purple, 3–4 ft.; elegans (Thunbergianum), orange, 1 ft., not hardy; Humboldti, orange yellow, 4 ft.; pardalinum (Leopard Lily), orange with purple spots, 4–5 ft.; and umbellatum, orange, 2–3 ft.

Propagation. Principally by offsets, but also to some extent by scales.

Disease. The fungus Botrytis cinerea, which attacks candidum in the garden about the time it comes into bloom, greatly disfigures the plant for the time being, but does not necessarily prevent it from flowering well the following year. Rich moist soil should be avoided. In bad cases the bulbs may be burned and fresh planted, these being lifted yearly and dusted with green sulphur.

A considerable Lily cult has grown up, and lovers of the plant should examine the writings of specialists and the operations of growers and societies.

Lily of the Valley (Convallaria majalis). This deliciously scented old favourite should be grown both outdoors and in. It is of the easiest cultivation, and inexpensive. It may be forced or treated as a simple greenhouse plant with equal success. Those who are satisfied with

flowers in April need give no artificial heat whatever. It suffices to put half a dozen " flowering crowns " with the tips exposed in a 5-in. pot in autumn in ordinary bulb soil, plunge them in fibre like Hyacinths, and put them in the greenhouse a few weeks later. They will remain with little or no sign of growth until the warm weather of spring comes, and then will come into bloom rapidly. What is more, the leaves will follow quickly on the flowers.

Forcing. When the crowns are forced in bottom heat the flowers come in advance of the leaves. By getting retarded crowns—that is, crowns kept dormant by cold storage—flowers may be had within a month from starting the forcing, and with successions the supply can be maintained over a long period. The crowns may be put in damp moss or moist cocoa-nut-fibre refuse for forcing, and should be kept in the dark until the spikes are well up, then put in the light and potted when the flowers show. Berlin crowns are good for forcing.

In the Garden. Choose a moist, shady place. A dressing of peat and leafmould will improve heavy soil. Buy special clumps and plant in autumn, not relying on forced crowns. Fortin's Giant is a fine variety, and there are several other large forms.

Lily Tree. See Magnolia.

Lily, Water. See Nymphaea and Water Lilies.

Lime. Very useful in gardens, although a shallow limestone soil is by no means the best for general gardening. Limestone and chalk are carbonates of lime (calcium carbonates); when they are subjected to great heat in a kiln a great deal of carbonic acid is driven off, and we get calcium oxide—caustic lime, quicklime. If the freshly-burned lumps are damped with a little water they crumble to a powder, giving off heat. This is calcium hydroxide, hydrate of lime or slaked lime. In the slaked state lime is easy of application. It may be applied at the rate of 14 lb. per square rod to land that has been heavily manured for several years, and will do good by neutralising the humic acid which has accumulated, and which checks decomposition and nitrification. It should not be applied to ground devoid of humus. Quicklime should not be added to decayed manure or soot, because it liberates ammonia. Ground chalk is a good application for light soil and may be used at the rate of 28 lb. per rod. Milk of lime is used in conjunction with copper sulphate as a fungicide (see Bordeaux Mixture). Fresh, powdered quicklime may be dusted over the ground at night to kill slugs. Gas-lime may be used at the rate of 14 lb. per square rod if green vegetables have been badly infested with club-root and gall-weevil, provided it is allowed to lie on the surface for 6 weeks before being turned in. To make lime-water, which is good for reducing slugs, put 3 lb. of lime in a gallon of water, and let it stand a few hours, then strain off the clear liquid and use at night. Hydraulic lime is impure chalk containing much silica.

Lime-sulphur. A combination of lime and sulphur has been found to be one of the best of fungicides and insecticides, and is recommended in several parts of this work. We do not give particulars for making it, because the process is somewhat slow and complicated, and because the manufactured article can be obtained of the proper strength (specific gravity 1·3 at, say, 60°), and with directions for use, at reasonable prices from most seedsmen and nurserymen. A brass, not copper, sprayer should be used in applying it.

Lime Tree or Linden. This is the Tilia (til-ia. Ord. Tiliaceæ) of Virgil. It is a handsome tree, with yellowish, highly-scented flowers in spring, which attract the bees. It does well in towns, and the avenues in Berlin are famous. A deep, well-drained, loamy soil is best. Vulgaris is the common Lime, and has a variegated form. Most nurserymen grow large quantities of common Limes for sale in autumn, winter, and spring, for avenues, streets, and other purposes, in the form of standard trees 8 to 9 ft. high, but so great is the demand that trees often become scarce in spring. Those who can afford the higher priced species petiolaris and euchlora (dasystyla) should prefer them to the common Lime. One advantage of euchlora is that it does not drip "honey-dew" like the common. Petiolaris is said to injure humble bees, and cases are reported of injury to hive bees. The White or Silver Lime, the underside of the leaf of which is silvery, is T. argentea; orbicularis is a variety. Other good species are americana, the American Bass Wood, and platyphyllos; there are many varieties of the latter. Plant in autumn or early spring.

Limnanthes (lĭm-năn-thēs. Ord. Geraniaceæ). Pretty dwarf hardy annuals, with yellow and white flowers, beloved by bees, and called Eggs and Bacon in Kent. Douglasi, 6 ins., is the most popular species. Sow in the open in spring. Ordinary soil.

Linaria, Toadflax (lī-nā-ria. Ord. Scrophularineæ). Pretty dwarf hardy plants, some annual, others perennial. The former are raised from seed in spring (see Annuals), the latter from seed and by division. They are not particular as to soil. Alpina, evergreen, which grows about 6 ins. high, and has charming violet and yellow flowers in summer, is excellent for the rockery. Cymbalaria, the Kenilworth Ivy or Pennywort, is a pretty lilac evergreen trailer for walls and banks; there is a white variety, alba; and a variegated, variegata. Bipartita, white, and its purple form splendida, 1 ft. high, and reticulata, 2 ft., with purple and yellow flowers, are hardy annuals. Dalmatica, yellow, 1½ ft., and repens, purple, 1 ft., and its white variety alba, are herbaceous. There are numerous other species of less importance.

Lindelofia (lin-de-lō-fia. Ord. Borragineæ). Hardy-plant dealers offer the species spectabilis (longifolia), a hardy herbaceous perennial with blue flowers in summer, height 1½ ft. It likes a warm light, loamy or chalky soil. Propagation is by division. Cynoglossum longiflorum is another name for this plant.

Lindera (lin-dē-ra. Ord. Lauraceæ). The only species of note is Benzoin, a hardy deciduous shrub with yellow flowers in spring, height 6 to 7 ft. It thrives in any good soil. Propagation is by cuttings in sandy soil under a handlight in autumn. Plant in autumn or spring.

Ling. See Calluna.

Linnaea borealis (lĭnn-ae-a. Ord. Caprifoliaceæ). A hardy trailing evergreen with pale pink fragrant flowers, often planted in peaty soil in the rock garden. It likes a shady position, and may be propagated by division in spring.

Linum, Flax (lī-num. Ord. Lineæ). Hardy annuals and perennials, some being very desirable plants, notably the hardy scarlet annual, grandiflorum rubrum (coccineum), 1 ft. high; and the herbaceous

perennials flavum, yellow, 15 ins.; narbonense, blue, 2 ft.; and perenne (Lewisi), blue, 1 ft. Alpinum is a charming rockery plant growing about 4 ins. high, with blue flowers in summer. Austriacum, blue, 1 ft.; campanulatum, yellow, 1 ft.; capitatum, yellow, 1 ft.; monogynum, white, 1 ft.; and tenuifolium, rosy lilac, 1½ ft., are all hardy herbaceous plants propagated by division in spring, or cuttings of the young shoots in spring. Grandiflorum rubrum is raised from seed; see Annuals. Arboreum, yellow, 1 ft., is evergreen. The Linums are not particular as to soil, so long as it is not stiff and damp. Although Linums are reputed sun-lovers, they will flower well in semi-shade.

Lippia, Lemon-scented Verbena (lĭp-i-a. Ord. Verbenaceæ). Only one species is grown to any extent, and that is citriodora, the foliage of which is strongly and agreeably scented. It is a white-flowered greenhouse shrub, liking loam with a little leafmould and a good deal of sand. In the south-west of England it succeeds out of doors. Propagation is by cuttings in a warm house or frame in spring. Aloysia citriodora is one of its synonyms, and Verbena triphylla is another. Plant in spring.

Liquidambar, Sweet Gum (liquid-am-bar. Ord. Hamamelideæ). A small genus of deciduous, balsamiferous trees, with Maple-like leaves. The most familiar species is styraciflua, with lobed leaves which colour well in autumn, and greenish-yellow flowers in spring, which yields the gum storax. It likes a deep, fertile soil in a sheltered place. Propagation is by layers in autumn. Plant in autumn or spring.

Liquid Manure. See Manures.

Liriodendron, Tulip Tree (lĭrio-dēn-dron. Ord. Magnoliaceæ). The species tulipifera is a handsome, hardy, spreading tree, which produces abundance of large, Tulip-like, green and yellow flowers in summer when some years old. It is a fine tree for a large lawn or extensive pleasure grounds. A loamy soil, lightened with peat, suits it best, but it is not fastidious. Propagation is by seeds in spring. Chinense is a modern species with smaller flowers, the colouring the same.

Lithospermum, Gromwell (lĭthos-pēr-mum. Ord. Borragineæ). The species prostratum is a good dwarf evergreen creeping shrub, suitable for the rock garden, and yielding a profusion of bright blue flowers in early summer. It is not particular as to soil, if sandy. Heavenly Blue and Cambridge Blue are lighter blues than prostratum, and equally beautiful. Propagation is by cuttings in sandy peat under a handlight, using firm ripe shoots. Graminifolium, blue flowers in spring, is a good Alpine, 6 ins. high. Angustifolium, yellow, 6 ins., is herbaceous.

Liverworts. See Bryophyta.

Livistona (lĭvis-tō-na. Ord. Palmæ). Handsome fan-leaved palms, the most popular species of which is australis. It likes a warm greenhouse, but with care may be grown in a room. Chinensis is the palm often grown under the name of Latania borbonica. For culture see Palms.

Loam. The frequent mention of this as the principal ingredient in composts would lead to the supposition that it is important to plants. Such is indeed the case. The "fibrous loam" of the gardener is the result of the decay of turves. The better the pasture the better the loam. The turf should be cut thicker than for lawns, stacked

grass-side downwards, and left for a year, when it should be chopped up and used. The layer of soil (" top-spit ") immediately beneath the turf of a good meadow is also excellent as potting loam, if yellow or light brown, but the grey soil from limestone is not good enough, and the dark soil from clay is not the best. Loam is the finest body soil for a garden, as when tilled and manured it suits nearly all plants. See also Soil.

Loasa (lō-ā-sa. Ord. Loasaceæ). Seedsmen offer aurantiaca, which is the lateritia of botanists, and can be treated as a half-hardy annual (see Annuals). It is a trailer or rambler with orange flowers in August. The hairiness is unpleasant.

Lobelia (lō-bē-lia. Ord. Campanulaceæ). A most useful genus, giving, as it does, dwarf bedding and tall herbaceous plants. The little border Lobelia as we meet with it in gardens is a form of the species erinus, which came from the Cape in the eighteenth century. It is itself a dwarf plant, but some of its varieties are still smaller. Among the seedsman's varieties one finds Cobalt Blue, Barnard's Perpetual, Crystal Palace, Emperor William, Imperial Blue, White Gem, Prima Donna, and others; all forms of erinus. Apparently Lobelias are grown as largely as they ever were, for, although the ribbon border is not as popular as it was, the want of a low, compact edging plant which will bloom profusely for several months often asserts itself.

Propagation. These Lobelias may be grown as half-hardy annuals, being raised from seed in a warm house or frame in winter. Afterwards they may be perpetuated by cuttings, taken in winter from " stock " plants lifted in autumn, potted, and wintered on the shelf of a warm house.

Pot Culture. Ramosa and its varieties, blue, white, and rose, are taller than erinus, and are often grown in pots. Tenuior, blue, is another charming sort for pots.

Border Kinds. Cardinalis is a hardy herbaceous perennial, growing about 3 ft. high, with scarlet flowers in summer, and green foliage. Fulgens is also a fine scarlet perennial, blooming somewhat earlier; there are many varieties of it; the well-known Queen Victoria differs in having purple foliage. All grow 2 to 3 ft. high. Syphilitica, blue, is a fine, tall, summer-flowering species, and is a hardy perennial. Tupa is a Chilian herbaceous species, scarlet, 3 ft., best in a sunny sheltered place. The perennials like rich, friable soil, and are propagated by cuttings in spring; it is best to winter cardinalis and fulgens in frames. They make beautiful beds and border groups if planted 2 ft. apart in May and well watered.

Locust Tree. See Robinia.

Locust Tree (of Scripture). See Ceratonia.

Loganberry. A hybrid fruit, raised in America, perhaps by intercrossing a Blackberry and a Raspberry. In Great Britain the Loganberry has been crossed with the Raspberry in the hope of getting a sub-hybrid of the same vigour and cropping power as the Loganberry, but with better flavour. Poor quality is, indeed, the great defect of the Loganberry. It is a tremendous grower, especially in moist clay land or rich loam, making shoots 10 ft. long or more, and nearly 1 in. thick, in a season. The fruit is much larger than that of either Blackberries or Raspberries, and is borne profusely. It may be stewed, preserved as jam, or canned in syrup.

Market Culture. During recent years it has been largely planted for canning, the shoots being trained horizontally or diagonally to horizontal wires, of which there are generally 4 lengths, each 1 ft. above the other, strained on stout posts. The plants should be 12 ft. apart, and the rows may be 7 ft. apart. Three tons to the acre is a satisfactory crop.

In Private Gardens. The Loganberry is suitable for planting against arches or pillars. It may be planted in deeply dug and manured soil between November and March inclusive. The plants should not be allowed to get crowded with old wood, but should be kept thin by pruning out in early autumn shoots which have fruited.

Propagation. Plants may be rooted from tips pegged down towards the end of summer, and will bear well in the third year.

Enemy. The Loganberry may be attacked by the Raspberry beetle (Byturus). Shake the canes over greased or tarred boards held slantingly against them in May when the beetles are laying eggs in the flowers.

Lomaria (lō-mā-ria. Ord. Filices). A large genus of ferns, resembling Blechnums, some hardy, notably Spicant, the British Hard Fern, which has broad, green, hard, leathery fronds; cristata, multifurcata and ramo-cristata are a few of the many varieties. They are propagated by division. Gibba requires a warm greenhouse; Bellii is a pretty variety of it. Ciliata, which resembles gibba, is a good room fern; grandis is a good variety of it. These should be grown in loam and peat, equal parts, with sand. Propagation is by spores (see Ferns) and offsets.

London Pride (Saxifraga umbrosa). A pretty edging plant, hardy, perennial, throwing up sprays of rosy flowers in summer; height 6 ins. It is not particular as to soil, and may be increased by division in spring.

Lonicera, Honeysuckle (lon-i-cē-ra, often lon-īc-er-a. Ord. Caprifoliaceæ). As the Honeysuckle genus, this is one of considerable importance and we have accordingly given attention to it under Honeysuckle. We may, however, add a few remarks on a few modern species, notably such bush evergreens of modern introduction as nitida and pileata. The former is becoming very popular as a hedge plant (see Hedges). The latter is suitable for rockwork; its variety yunnanensis is very beautiful in autumn with its masses of amethyst-coloured fruits. Maackii, white, 8–10 ft., makes a fine bush. Chaetocarpa is also of bushy habit, and produces large primrose-coloured flowers in pairs. Belgica, yellow flowers with carmine tube, sweet, evergreen; tragophylla, evergreen, yellow, not sweet, a twiner; Giraldii, bronzy leaves and violet flowers, a twiner; and Henryi, chocolate and yellow, an evergreen twiner, are all interesting. Plant in autumn or spring.

Loosestrife. The purple Loosestrife is Lythrum Salicaria; the yellow is Lysimachia vulgaris. Both are native plants, but are often planted in gardens by the side of water or in semi-wild parts. Height 4 ft. to 6 ft.

Lophospermum. See Maurandia.

Loquat. See Eriobotrya.

Lord Anson's Pea. See Lathyrus.

Loropetalum (lo-ro-pĕt-a-lum. Ord. Hamamelideæ). The only species

is chinense, a deciduous shrub with white flowers in autumn, height 3 to 4 ft. It is a very ornamental plant, liking, and deserving, good loamy soil. Propagation is by cuttings under a handlight in summer or by layers in autumn. Plant in autumn or spring. Pot-culture is practised with it in large places, a cool greenhouse being chosen, as forcing in heat is undesirable.

Lotus (lō-tus. Ord. Leguminosæ). This is a very large genus, but not much use is made of it in gardens. The double form of corniculatus, the native Bird's-foot Trefoil, a hardy herbaceous perennial, is, however, grown on the rockery, where its golden-yellow flowers are very attractive in summer. Ordinary soil. Propagation is by division in spring.

Lotus, Sacred. See Nelumbium.

Love Apple. See Tomato.

Love Grass. See Eragrostis and Annuals.

Love-in-a-mist (Nigella). A pretty hardy annual (see Annuals). The largest variety is Miss Jekyll, which has fine blue flowers, and is one of the best late-blooming annuals, especially on limestone.

Love-in-idleness. See Pansy.

Love-lies-bleeding. See Amaranthus caudatus.

Luculia (lū-cū-lia. Ord. Rubiaceæ). The fragrant greenhouse shrub, gratissima, bears pale pink flowers in autumn, and is good for planting out in a large house. It thrives in equal parts of peat and loam, with sand. Propagation is by cuttings in heat in early summer. Prune back to the old wood in winter.

Lunaria. See Honesty.

Lungwort. See Pulmonaria.

Lupinus, Lupin (lū-pī-nus. Ord. Leguminosæ). Popular plants, including both hardy annuals and perennials.

Principal Species and Varieties. Arboreus, the tree Lupin, is a hardy evergreen with purple and yellow flowers in summer, growing 5 to 6 ft. high; Snow Queen (White Queen) is a good white variety. Hartwegi, blue and white, 2 ft., is a hardy annual. Hybridus atrococcineus is a splendid annual, scarlet with white tips, probably a form of mutabilis. Nanus, blue and white, 1 ft., is a hardy annual. Polyphyllus is a fine blue hardy herbaceous perennial, 3 to 4 ft. high; alba, white; Purple King, purple; and Somerset, yellow, are forms of it, but there are many varieties and hybrids offered by seedsmen in separate colours and mixtures. Subcarnosus, blue and white, 1 ft., is a perennial.

Garden Strains. There are now some splendid garden strains of Lupins, both annual and perennial, but particularly the latter, which are so fine as to rival Delphiniums and have a wider range of colours; they are quite perfectly hardy and thrive in almost any soil. Height 3 ft. Sow outside in spring. Perennials equally with annuals seed freely.

Lycaste (lȳ-cās-tē. Ord. Orchidaceæ). A small genus of Orchids, requiring a warm house, with abundance of water in the growing season, and little during the period of rest. They thrive in fibrous peat. Propagation is by division after flowering; 50° to 60° will be a suitable temperature in winter, 70° to 80° in summer. Skinneri, with red and white flowers in winter, 15 ins. high, is the most popular species; there are many varieties of it, as well as some hybrids. Costata, cream, and gigantea, purple and orange, are also grown.

Lychnis, Rose Campion (lȳch-nis. Ord. Caryophylleæ). Beautiful hardy plants, comprising both annuals and perennials. The most popular of the latter is chalcedonica, which grows 2 to 3 ft. high, and bears light scarlet flowers at the top of the stems. The latter are easily broken from the rootstick and the plant should therefore be handled carefully. It may be propagated by seed or division in spring. It is not fastidious about soil. There are white and double varieties. Coeli-rosa, the Agrostemma Coeli-rosa of gardens, is a pretty hardy annual with rose and white flowers. Coronaria (Agrostemma coronaria) is a perennial 3 ft. high, with red flowers and silvery foliage; there are white and double varieties. Flos-cuculi, red, 1 ft. high, early summer, is the British Cuckoo Flower or Ragged Robin, a pretty wilding. Fulgens, vermilion, 1 ft., early summer, and its variety Haageana, scarlet, are perennials; as is Viscaria, the German Catchfly, whose double rose variety, splendens plena, is a beautiful late spring perennial with rose flowers. Grandiflora is a rare Chinese species, scarlet, 1 ft., not quite hardy. Vespertina (alba) is the perennial white Campion. Diurna or dioica is the native Red Campion, of which the double form is grown in gardens. Most of the Lychnises thrive in ordinary garden soil, and are easily raised from seed in spring; where seed is not available, division may be pursued in early autumn, or cuttings used in early spring.

Lycium, Box Thorn (lȳc-i-um. Ord. Solanaceæ). The species barbarum, with its narrow leaves and spiny joints (hence Box Thorn; it is also known as Tea Plant) and reddish veined flowers, a deciduous rambler, is sometimes grown, but it is not of much importance. Any soil.

Lycopersicum esculentum. See Tomato.

Lycopodium, Club Moss (lȳcō-pō-dium. Ord. Lycopodiaceæ). The Lycopodiums form dense masses of verdure. Clavatum is the British Club Moss. Peat, with a quarter each of Sphagnum moss and sand, suits. Tips of the growing shoots soon make plants if put in a warm, shady place. The plants are best grown in wooden baskets. They must have shade and abundance of water in summer, but little water in winter.

Lygodium, Climbing Fern (lȳ-gō-dium. Ord. Filices). The species japonicum (scandens of gardens), the Climbing Fern, is suitable for growing up the pillars and walls of warm greenhouses and conservatories, especially if it can be planted out. Peat, loam, and leafmould in equal parts, with sand, make a suitable compost. Propagation is by spores (see Ferns) or division in spring or summer. Syringing is beneficial on hot days. Palmatum is a good greenhouse species. Dichotomum needs a stove.

Lyre Flower. See Dicentra and Dielytra.

Lysimachia, Loosestrife (lĭssy-māk-ia. Ord. Primulaceæ). Clethroides, white flowers in late summer, 3 ft., is one of the best species for the herbaceous border. Nummularia is the popular "Creeping Jenny," which cottage folk love to grow in suspended pots. It thrives in any soil, and is easily propagated by division; the variety aurea has golden leaves. See also Loosestrife.

Lythrum (lȳ-thrum. Ord. Lythrarieæ). Salicaria is the purple Loosestrife, a hardy perennial, 4 to 6 ft. high, that luxuriates at the waterside. Rosea and superba are varieties of it. Propagation is by division in spring.

M

Maackia (mā̆ack-ia. Ord. Leguminosæ). The species amurensis is an ornamental deciduous shrub or small tree growing up to 6 ft. high, with greenish-white flowers in summer. It likes a friable loamy soil. Cladastris amurensis is the same thing. Plant in autumn or spring.

Macartney Rose. See Rosa bracteata.

Macrotomia (măc-ro-tō-mia. Ord. Borragineæ). A small genus, the most prominent member of which is echioides, the Prophet Flower, also called Arnebia echioides. It grows about 1 ft. high, and has yellow flowers spotted with brown in early summer. Benthami, purple, summer, 2 ft., is also grown. They thrive in a sunny part of the rockery in loamy soil, and are propagated by division in spring.

Madonna Lily. See Lilium candidum.

Madwort. See Alyssum.

Magnolia, Lily Tree (mag-nō-lia. Ord. Magnoliaceæ). Beautiful shrubs, some deciduous, others evergreen, some hardy, others half-hardy. The Magnolias are among the noblest of flowering shrubs, and are worthy of conspicuous positions, planted either singly or in groups, according to the species and the space available; one healthy plant of Soulangeana, for example, will occupy a considerable area and make a splendid object, say on a lawn or other selected position. Shelter without shade is desirable, to avoid injury from cold winds in spring.

Principal Species and Hybrids. Conspicua, the Yulan, has beautiful white flowers in spring and is deciduous. Grandiflora, large white, is evergreen and a fine plant for a large wall. Lennei, rosy-purple, spring, is deciduous. Soulangeana, purple and white, spring, is deciduous. Stellata (Halliana), dwarf, white, blooms in advance of its leaves in spring, is deciduous. There are many varieties. Stellata is a suitable subject for pot culture.

Among modern species, Delavayi, cream flowers, evergreen, may be mentioned as a good plant for a large sheltered wall.

Soil. The plants are worthy of good soil, and the best results must not be expected in poor sand or in shallow soil over chalk; nor is dense damp clay suitable. A friable loamy soil is best. Plant in spring.

Propagation. By layers in autumn for the commoner sorts. Nurserymen also use cuttings and grafts for the better kinds.

Magpie Moth Caterpillar. See Gooseberry: Enemies.

Mahonia Aquifolia. The same as Berberis Aquifolium, which see.

Maidenhair Fern. See Adiantum cuneatum.

Maidenhair Tree. See Ginkgo biloba (Salisburia adiantifolia).

Maiden Pink. See Dianthus deltoides.

Maiden's Wreath. See Francoa.

Maize, Zea (zē-a. Ord. Gramineæ). Maize, or Indian Corn, is much esteemed in the United States of America. It is less grown as a food crop in Great Britain, because the climate does not permit of ripening it. Nevertheless both farmers and gardeners use it to some extent. If a useful garden crop is wanted, an early sugar corn should be grown, the seed being sown in a warm house or frame in spring, the plants hardened and put out 2 ft. apart in June; or seed may be sown outdoors in May. It is ready when the grains are milky. Golden Bantam is a good variety. Zea Mays variegata, Japanese striped Maize, and Four-coloured Maize, both about 3 ft., are good for use in large flower gardens; and they may be raised from seed in spring, sowing in heat and hardening in a frame for planting out in June. Good garden soil is desirable; poor ground gives indifferent results, especially if the season should be dry. Those who wish to use Maize for cooking should plant 18 ins. apart in rows 5 ft. asunder, and gather the cobs before they get hard.

Malcolmia, Virginian Stock (mal-cō-mia. Ord. Cruciferæ). Only one species is important, and that is maritima, the Virginian Stock, a pinkish-lilac hardy annual, which blooms in a few weeks from seed sown outside in spring, and makes a charming border.

Male Fern. See Nephrodium (Lastrea) Filix-mas.

Mallow, Jew's. See Kerria.

Mallow, Musk. See Malva moschata.

Mallow, Rose. See Lavatera rosea.

Mallow, Tree. See Lavatera arborea.

Malope, Mallow (ma-lō-pe. Ord. Malvaceæ). Tall, strong, hardy annuals. Trifida grandiflora has dark, rose flowers; there is a white form called alba. Height 3 ft. Sow outside in spring.

Malus. See Pyrus Malus and Apples.

Malva, Mallow (māl-va. Ord. Malvaceæ). Hardy herbaceous annuals, biennials, and perennials, the most popular of which is moschata, the Musk Mallow, a hardy perennial with rose flowers in summer, height 2 ft.; there is a white variety. Any good soil. Propagation by seed or division in spring.

Mamillaria. See Cactus.

Mandevilla. The species suaveolens is a half-hardy perennial climber with fragrant white flowers in early summer. It may be planted out in a large house. Propagation is by cuttings under a bell-glass with bottom heat in summer; and by seeds. Loam, with a fourth of decayed manure and some sand, makes a suitable soil.

Manetti. See Rose. The Manetti is used by nurserymen as a stock on which to bud certain varieties of Roses. It is itself propagated by cuttings.

Manna Ash. See Fraxinus Ornus.

MANURES AND MANURING

Without a proper choice and use of manures, gardening cannot be carried on successfully, and a study of manures should be one of the first tasks of the learner. Virgin ground, such as is found in new countries, will produce good crops for several years without manuring; but where crops have been grown over a long period, frequent manuring becomes necessary.

Natural Manures. Dealing with these first of all, the following tables will be useful:

1 ton of good decayed stable manure contains approximately	12 lb.	potash
	8 ,,	phosphoric acid
	11 ,,	nitrogen
	16 ,,	lime
	47 ,,	
1 ton of cow manure contains approximately	8 lb.	potash
	3 ,,	phosphoric acid
	9 ,,	nitrogen
	10 ,,	lime
	30 ,,	
1 ton of pig manure contains approximately	4 lb.	potash
	4 ,,	phosphoric acid
	16 ,,	nitrogen
	35 ,,	lime
	59 ,,	

The plan of calculating the value of manure by the proportions which it contains of the four ingredients quoted is useful as a general guide, because they are the principal requirements of crops; at the same time, it should be pointed out that the proportions vary with the food of the animals. The excrement of cows fed on Turnips is not so rich as that of animals which are allowed cake. We see that pig manure is nominally the richest, but that much the largest proportion of its fertilising constituents is lime, and on most soils that is not so important as any of the other three. On the whole, manure from stables is the best; but cow manure is preferable to horse manure on dry soil.

Hotbed Manure. A double use should be got from every cartload of fresh manure in a garden. The first use is to yield heat, and this the manure will do if, when taken from the stables, it is turned in and out on 3 successive days, and then trodden down into a hotbed (see Hotbeds, Annuals, Mushrooms, Violets, and other crops). After it has served its purpose as a hotbed, it will be thoroughly decayed and in excellent condition for dressing ground. When manure has to be laid up for a time, the heap should be made at a spot remote from dwellings, and on a bed which will retain the ammonia-enriched liquid that drains out of the heap. A light coat of gypsum will fix the ammonia.

Quantities of Manure. A good quantity of manure to use is 2 barrow-loads per square rod of ground, or 30 tons per acre. In heavy soil it serves the best purpose when worked under the top-spit towards the end of winter (see Bastard-trenching and Digging). In light soils over sand or chalk, it is best laid on the top after autumn bastard-trenching, and dug into the top-spit in spring. Human excrement (" Night Soil ") is best laid up, where available, in a heap with ashes, and turned into ground which is to be cropped with coarse Green vegetables.

Fowl Manure. This is very strong, and is best dried and then mixed with a considerable bulk of earth or wood ashes before use.

Dried Blood. A good fertiliser, especially for Green vegetables and Onions. To every gallon of blood 1 lb. of freshly-slaked lime should be added for drying purposes.

Liming. When manure decays in the soil, humic acid accumulates, and it sometimes happens that after a piece of ground has been manured for several consecutive years crops do badly on it. To use the gardener's phrase, it has become "manure-sick." To speak with greater exactitude, an excess of humic acid has accumulated. The best plan in such a case is to dress the ground with broken chalk or lime. (See Lime.)

Artificial Manures. The fact that natural manures owe their value to the proportions which they contain of certain ingredients has led to the development of what are called artificial or chemical manures. It was known that bones nourished crops, but that their action was slow. Various plans were tried to bring the bones into a quicker-acting state, amongst them that of treating with sulphuric acid. This proved to be successful, and the product was put on the market under the name of superphosphate of lime. Bone flour, bone meal, and mineral superphosphate are other forms of prepared bone.

Phosphates. The following are the percentages of tricalcic phosphate in different fertilisers:

basic slag (not needed on chalk)	38	
steamed bone flour	58 to 60	
bone meal	45	(also yields ammonia)
dissolved bones	32	
fish guano	18	
ground mineral phosphate	(up to) 65	
phosphate of potash	37	(also yields potash)
superphosphate of lime	26 to 35	

Basic slag, a by-product of the ironworks, is nominally the most economical form of phosphoric-acid fertiliser for soils which lack lime, but does its best work on grass. Superphosphate of lime is the best for soils containing lime. Mineral superphosphate at the rate of 7 lb. per square rod is a valuable fertiliser for fruit trees and pod-bearing crops. It may be applied in February, but should not be dusted over young growing crops.

Potash. This is also highly important. The proportions in different chemical manures are as follows:

sulphate of potash	90 per cent	(48 per cent pure)
nitrate of potash	83 ,, ,,	(also contains nitrogen)
muriate of potash	80 ,, ,,	(50 per cent pure)
phosphate of potash	48 ,, ,,	(also contains phosphoric acid)
kainit	12½ ,, ,,	
potash salts	20 to 30 per cent	

Nitrate of potash, as also yielding nitrogen, and phosphate of potash, as also yielding phosphoric acid, are particularly valuable, but their cost is high. Kainit is good as a winter application turned well under at the rate of 14 lb. per square rod, but on the whole inferior for garden purposes to sulphate of potash, which is excellent, and may be

used at the rate of 4 lb. per square rod; or 2 lb. may be used with 3 lb. of superphosphate, the two being mixed and applied about midwinter.

Nitrogen and Ammonia. The nitrogenous fertilisers are valuable according to the quantity of ammonia which they yield. The following is a table of kinds and quantities:

sulphate of ammonia	20 to 24 per cent	
nitrate of soda	18 per cent	
nitrate of potash	15¾ „ „	(also contains potash)
hoof and horn parings	16 „ „	
castor meal	5½ „ „	
rape dust	5 „ „	
nitrate of ammonia	33½ „ „	
nitrate of lime	15½ „ „	
feather waste	10 „ „	
soot	(up to) 6 „ „	
shoddy	2 „ „	(upwards)
nitrolim (calcium cyanamide)	18 „ „	(upwards)

The last, a modern fertiliser, contains 20 to 30 per cent of free lime, and is a valuable manure for limeless soils. It could be used as a top dressing for weakly crops in the same way as sulphate of ammonia and nitrate of soda. It is wasteful to dig these into vacant ground in winter. Shoddy, a waste from the wool factories, yields ammonia, and is used by Hop growers. Hoof parings yield phosphoric acid.

Sulphate of Ammonia and Nitrate of Soda. These are undoubtedly the two most important nitrogenous fertilisers. Sulphate of ammonia is particularly important, as mixing well with superphosphate of lime (the most important phosphatic fertiliser) and sulphate of potash (the best potash fertiliser). The three can be mixed in a complete fertiliser in the following proportions by weight, a little steamed bone flour being added, partly as yielding phosphates slowly, partly as preventing the mixture from caking very hard:

Complete or Perfect Fertiliser

superphosphate of lime, 35 per cent grade	4
sulphate of ammonia	1
sulphate of potash	1
steamed bone flour	1

Used at the rate of 4 to 6 lb. per rod in late winter, this mixture is good alike for vegetables, fruit, and flowers. It can be kept for a considerable time after mixing if the place is dry; and lumps which form can be crushed easily. It may be spread over the ground and dug in for general crops, and sprinkled in the drills for Potatoes at planting time. For pot plants, sprinkle a thin coat over the surface of the soil and water in.

Liquid Manure. Plants coming into flower, vegetables in pod, and trees in fruit are benefited by liquid manure, whether in the form of liquid from stables and cow-houses, broken down to the colour of weak tea with water; house slops; nitrate of soda and superphosphate at the rate of ½ oz. each per gallon of water; or sheep-droppings soaked in water.

Soot-water. This is an excellent liquid, made by putting some soot into a piece of sacking and hanging it in a tub of water for a few hours. Dry soot is a safe stimulant for most crops if spread on the ground ½ in. thick and hoed in.

Green Manure. Mustard at the rate of 2 oz. per rod, with ½ oz. of Rape, mixed and sown in summer after early Potatoes, Peas, or Broad Beans, and cut down and dug in early in winter, is the best green manure. It is particularly useful where wireworm is troublesome. Farmers often sow it for autumn sheep-food.

Hop Manure. Useful at the rate of 2 bushels per rod.

Seaweed. May be used near the sea. It should be laid up in summer and turned several times before use at the same rate as stable manure.

Dry Soot. Good at the rate of ½ peck per rod. Wood ashes, but not coal ashes, may be mixed with it. Lime and soot should not be mixed except for immediate digging-in, or ammonia will be lost.

Maple. These handsome trees are of considerable importance, as we see under Acer. A. campestre is the common Maple, Negundo (the variegated form of which is so beautiful as a small tree) is the Ash-leaved Maple or Box Elder, palmatum is the Japanese Maple, platanoides is the Norway Maple, Pseudo-platanus is the Sycamore or Mock Plane, rubrum is the Scarlet Maple, and saccharinum is the Sugar Maple. The Norway Maple is a good town tree, particularly as represented by the two fine forms Schwedleri and Reitenbachii. For real leaf-beauty, however, the dissectum section of the Japanese Maple stands apart, for the foliage is elegantly cut as well as richly coloured; the members are hardy, but look their best in a sheltered position. Deep loamy soil suits. Maples are not at their best on sand or chalk. See also Acer. Plant in autumn or early spring.

Maranta, Arrow-root (mă-răn-ta. Ord. Scitamineæ). Hothouse herbaceous perennials with handsome foliage, thriving in loam, one-third leafmould, and sand. Propagation is by division when growth starts in spring, putting the divisions in bottom heat. Chantrieri, major, Massangeana, and zebrina are popular, the latter (now called Calathea zebrina by botanists) particularly so.

Marguerite. The Marguerite (Chrysanthemum frutescens) is a useful pot plant for cool greenhouses and conservatories, and also for window-boxes. It grows freely, forms nice bushes, blooms abundantly, and is easily grown. Cuttings of young shoots, or from the base, strike readily in spring, summer, or autumn in sandy soil. Good plants can be grown in 6-in. pots. If grey lines show in the leaves, indicating the presence of a grub, they should be pinched between thumb and finger. If the trouble persists, spray with paraffin emulsion. See Paraffin. The yellow Marguerite, Etoile d'Or, is almost as popular as the white, and both may be grown successfully under similar treatment. Mrs. F. Sander, white, with Anemone-like frilled flowers, is very pretty. Pink Queen and Alexandra are also good. The Blue Marguerite is Agathaea coelestis, and belongs to a different genus. It may, however, be grown in the same way as the true Marguerites. For Margaret (or Marguerite) Carnations see Carnation.

Margyricarpus, Pearl Berry (mär-gy-ri-căr-pus. Ord. Rosaceæ). The only species much grown is setosus, an evergreen shrub with feathery

leaves and small green flowers followed by white fruits. It is suitable for the rockery, in sandy loam and leafmould. Propagation is by cuttings in summer, inserted in sandy soil under a handlight, and by layering in autumn. Plant in autumn or spring.

Marigold, Cape. See Dimorphotheca.

Marigold, Fig. See Mesembryanthemum.

Marigold, Marsh. See Caltha.

Marigolds. The popular Marigolds grown as half-hardy annuals, generally in the form of large double lemon and orange African and smaller striped French, have come from Tagetes erecta and T. patula (corymbosa) respectively. They need no description, as they are already familiar. Legion of Honour, yellow with brown flakes, 9 ins. high, is charming. Treatment as half-hardy annuals, that is, sowing in boxes late in winter, pricking-out 3 ins. apart in other boxes, and planting out 18 ins. apart in May or June, suits. Good garden soil, friable and well-drained, meets their needs.

The so-called "Baby Marigold" (Tagetes signata pumila) is a charming little plant suitable for an edging, with orange-coloured flowers and aromatic leaves. Treat like the others, but plant 9 ins. apart.

Mariposa Lily. See Calochortus.

Marjoram. The Pot and Sweet Marjorams, respectively Origanum Majorana and O. Onites, are both used for flavouring. They may be raised from seed sown outside in spring and the Pot Marjoram may also be increased by division. See also Herbs.

Marrow, Vegetable. See Vegetable Marrow.

Marsh Marigold. See Caltha.

Martagon. See Lilium Martagon.

Martynia (mar-tin-ia. Ord. Pedalineæ). The most popular member of this genus is fragrans, a greenhouse annual with perfumed crimson flowers in summer, height 2 ft. Sow in a greenhouse in spring, and when the seedlings are strong pot in 5-in., using loam with a fourth of leafmould and some sand.

Marvel of Peru. See Mirabilis.

Masdevallia (măs-de-văll-ia. Ord. Orchidaceæ). Brilliant Orchids, with flat flowers, thriving in a warm greenhouse in a compost of fibrous peat and Sphagnum moss over abundance of crocks. During the growing season in summer they must have liberal supplies of water, but little will be wanted in winter, when they are resting. They thrive in a cool house, and are propagated by division at midwinter, when fresh growth starts.

Principal Species. Coccinea, red, spring, 8 ins. high; ignea, orange, spring, several varieties; tovarensis, white, winter, 6 ins., free-flowering, and Veitchiana, vermilion, spring, 1 ft., are a few of the best species; but there is much interest in the modern hybrids, for particulars of which a good work on Orchids should be consulted.

Matricaria (mat-ri-cā-ria. Ord. Compositæ). The most useful of these are the hardy annual varieties offered by seedsmen, such as inodora plenissima, double white; and eximia Golden Ball and Silver Ball. They can be sown outside in spring in ordinary soil and thinned to 1 ft.

Matthiola (matthi-ō-la. Ord. Cruciferæ). The only species grown under the generic name is the Night-scented Stock, which has lilac

flowers that are open and deliciously scented in the evening, but dull in the morning. Sow in an inconspicuous place near the house in spring, in ordinary soil. This is the seedsman's hardy annual, M. bicornis, but botanists claim M. tristis as the Night-scented Stock, disagreeing, however, as to whether it is a biennial or an evergreen. M. annua has given the Ten-week and Intermediate Stocks. M. incana has given the biennial Brompton Stocks. Fenestralis is a downy Cretan species, with scarlet flowers in summer. It is sub-shrubby and may be treated like Brompton Stocks. See Stocks.

Maurandia or Maurandya (măur-ăn-dia. Ord. Scrophularineæ). Climbing plants for the cool greenhouse, or for the pergola or a warm wall outside in summer. Barclayana, with violet flowers in summer; and scandens (Lophospermum scandens), purple flowers in summer, are the best known. They may be raised from seed in heat in spring, and further increased by cuttings under a handlight in summer. Friable loamy soil suits them.

Maxillaria (max-ill-ă-ria. Ord. Orchidaceæ). Terrestrial Orchids with fleshy flowers, suitable for a cool house, thriving in pots in equal parts of peat and chopped Sphagnum moss, and propagated by division in spring. They are great moisture-lovers, and like a shady place. Grandiflora, white and red; Lindeniae, white and pink; Sanderiana, white and red; and tenuifolia, dark red and yellow, are a few of the most popular species.

May. See Crataegus.

May Bug. See Cockchafer.

May Flower. See Epigaea repens.

Mays. See Maize.

Mazus (mā-zus. Ord. Scrophularineæ). A small genus, of which the species pumilis is the best known. It is a tufty perennial herb, growing only 3 or 4 ins. high, with underground stems and violet flowers in summer. It is suitable for the rockery, where it will thrive in sandy loam. Propagation is by division in spring.

Meadow Rue. See Thalictrum.

Meadow Saffron. See Colchicum.

Meadow Saxifrage. See Saxifraga granulata.

Meadow Sweet. See Spiraea Ulmaria.

Mealy Bug (Coccus adonidum). One of the worst enemies of indoor plants. It attacks hothouse, greenhouse, and vinery occupants indiscriminately. The white cottony substance seen is merely a covering, the red insect lies beneath, sucks out the sap, and renders the foliage offensive with its excrement. Regular syringing in summer, with an occasional vaporising by cone, goes far in keeping mealy bug under. Syringing with a paraffin emulsion (see Paraffin) is good where practicable. In an emergency the leaves must be sponged. If vineries become infested they must be cleansed, together with the rods, in winter.

Meconopsis (mĕc-on-ŏp-sis. Ord. Papaveraceæ). Hardy herbaceous annuals, biennials, and perennials. Cambrica, the Welsh Poppy, is a hardy perennial with yellow flowers in summer, 1 ft. high; there is a double form called plena. Wallichii, 3 to 4 ft., blue drooping flowers in summer, is a good perennial, enjoying a sheltered, moist position. It is short-lived, and an annual sowing should be made.

Integrifolia, 1½ to 2 ft., is a splendid modern yellow species, a biennial. Punicea, 1½ to 2 ft., has brownish-red flowers. Paniculata has hairy foliage and drooping yellow flowers. Racemosa, 1½ to 2 ft., varies from blue to purple. Baileyi is a beautiful Tibetan species with downy leaves and large blue drooping flowers; height 2 ft. Quintuplinervia, hairy foliage, nodding blue flowers, is a modern Chinese species introduced by Farrer. These grand Poppyworts like cool spots in the rock garden or border, and are easily raised from seed, which is best sown when ripe in August in the open, preferably on a north aspect. Friable loamy soil is best.

Medeola. The species asparagoides is the same as Asparagus medeoloides, which see. This is the popular " Smilax " of gardeners, who grow it as a trailer in vineries, etc. It is not the Smilax of botanists.

Medlar (Mespilus or Pyrus germanica). An unimportant fruit, and one that need be given space only in large gardens. The twisted growth is peculiar, and the flowers are not without beauty, so that it may be planted in extensive shrubberies. It will succeed in well-drained loamy soil. Fruit-dealers bud their Medlars on to Quince or other stocks. Beyond a little early shaping, not much pruning is required. The fruit should be gathered at the end of summer, and stored until it begins to decay. It is then in what is known as the " bletted " stage and ready for use.

Medulla. The medulla of the plant is the pith, which is connected with the exterior by rays (medullary rays).

Megasea. A section of Saxifrages, which see.

Melasphaerula (mēla-sphae-rū-la. Ord. Irideæ). The one species grown, graminea (parviflora), is a Cape bulbous plant with creamy flowers, suitable for the greenhouse or for a sheltered place on the rockery, in sandy loam and leafmould. Propagation is by offsets while dormant. The numerous small bulbs are black.

Melianthus, Honey Flower (mēl-i-ăn-thus. Ord. Sapindaceæ). Seedsmen offer the species major, a South African evergreen shrub, with fern-like leaves and brown flowers, growing 4 ft. high or more. Sow in heat in February and plant in a sheltered place in June.

Meliosma (mēl-i-ŏs-ma. Ord. Sabiaceæ). Chinese and Japanese deciduous shrubs or small trees, with Spiraea-like, white, scented flowers. Myriantha, hardy, is perhaps the best known. It thrives in any good garden soil. Propagation is by suckers. Other species are Beanianum, cuneifolium, pungens, and tenuis. Plant in autumn or spring.

Melissa. The only species grown is officinalis, the Common Balm. See Balm and Herbs. The Bastard Balm is Melittis Melissophyllum.

Melocactus. See Cactus.

Melolontha. The species vulgaris is the May Bug or Cockchafer. See Cockchafer.

Melon (Cucumis Melo. Ord. Cucurbitaceæ). A large, juicy, and delicious fruit, grown in practically every large garden and in a good many small ones. Melons are grown in span-roof houses, in pits, and in frames. They thrive when planted out in mounds of soil made on slates on the stage of a warm span-roof house, the same as Cucumbers; but they need more air and less moisture than Cucumbers, and the soil should be firmer, closer, and less lumpy. The structure must be light, as without sun the flavour will be poor; on this account shade

must be avoided. French gardeners grow Canteloupe Melons in small frames.

Propagation. There is no difficulty in getting a supply of plants from seed, which should be sown singly in small pots in a compost of loam, leafmould, and sand, in winter or spring, according to when the crop is required. Approximately 4 months may be allowed from sowing to cutting, but the time may be longer with spring crops and shorter with summer ones. If the pots can be plunged in bottom heat, or stood in a warm house, germination will be speedy, and the plants may be ready for putting out within the month. When they have rooted freely in the small pots they may be shifted to 5-in., and grown in them until the house is ready for them. The leading shoot must not be stopped, but side shoots should be pinched out. The length to which the plants may go must depend on circumstances, but they are generally in good condition for planting when they are about 1 ft. high and have several rough leaves. When they are grown for frame culture it is well to nip off the tip of the plant when it has made a pair of rough leaves, and so encourage it to push side shoots for training over the hotbed.

House or Pit Culture. The structure should be a light, airy one, in which a minimum night temperature of 60° can be maintained. The mounds may be made up of loam, with a little decayed manure or leafmould and some sand, and there should be just enough soil to cover the ball when the plant is turned out of its pot. Top-dressings can be given afterwards. The leading shoot may be allowed to go up the roof, where it can be secured to wires strained about 1 ft. below the glass. Side shoots will form, on which two kinds of blossom will show, one with an incipient fruit at the base, the other without. The latter is the pollen-bearer, and when the pollen is ripe and loose the flower should be picked and pressed into the centre of the fruit-bearer, which, thus impregnated, will begin to swell. Half a dozen fruits may be fertilised on each plant, and it may be done at intervals of 2 or 3 days. The shoots bearing the fruits may be stopped 2 leaves beyond them. While the air should be kept fresh, it should not be saturated with moisture like a Cucumber house. When the fruit is ripening keep a brisk bottom heat, and give reduced supplies of tepid water.

Frame Culture. To grow Melons successfully in a frame, a hotbed of manure and leaves should be made up after turning the manure 2 or 3 times at intervals to sweeten it; the heap should be well trodden, and a mound of soil put in the centre. The plants will push side shoots as a result of the stopping previously advised, and these can be trained over the bed in different directions, so as to cover it without crowding. Side shoots may be removed bodily if they push in large numbers and crowd the frame. A close covering, but not a thick pack, of leaves is desirable. When roots show through the mound of soil top-dress with fresh warm compost. Give regular attention to watering, never allowing the soil to get dust dry.

Canker. This fungus may attack the stems of plants, whether in houses, pits, or frames, if water lodges round the collar. Keep the soil close there. Sulphur and lime may be mixed and rubbed over the affected part.

Varieties. Imperial Green-flesh is very fine; it is a large, solid,

well-flavoured fruit. Superlative is a large red-flesh sort. Hero of Lockinge, white flesh, is good for a frame, and so is Blenheim Orange. See also seedsmen's specialities.

Melon Thistle. See Melocactus.

Mendelism. A subject of considerable interest. Briefly, definite characters exist in plants, as in animals, which reveal themselves in certain fixed proportions. Some (Dominants only) appear in the first generation, from seed. Others (Recessives) do not appear till the second generation, together with Dominants. Inasmuch as certain characters breed true in the second generation and others do not, a study of Mendelism is important to hybridists, who should examine modern works on the subject.

Menispermum, Moon Seed (mĕn-i-spēr-mum. Ord. Menispermaceæ). Deciduous twining shrubs, of which canadense is the most familiar species, with its drooping yellow flowers in summer. It may be grown on a wall and prefers a shady site. Propagation is by division or cuttings in spring. Plant in autumn or spring.

Mentha. Mint and Pennyroyal (which see) both belong to this genus. Menthas are now rarely used for ornamental purposes, although in the great carpet-bedding days of the past the variety of the species Pulegium (Pennyroyal) called gibraltarica was grown as a low, dense carpeter. Rooted pieces were grown in cold frames through the winter. The species Requieni is sometimes grown as a carpeter on the rockery.

Mentzelia. Allied to Bartonia. M. Lindleyi is the Bartonia aurea (which see) of seedsmen.

Menyanthes. The species trifoliata is the native Marsh Trefoil or Buckbean, a pretty plant worth growing in the water garden, where it will establish itself in the mud of shallow water.

Menziesia. See Daboëcia polifolia.

Mercury. See Chenopodium for the edible plant known as Good King Henry or Mercury. The Dog's Mercury (Mercurialis) is, of course, a poisonous weed.

Mertensia (mer-tĕn-sia. Ord. Borragineæ). Hardy herbaceous perennials, suited for the front of the border or the rockery, thriving in almost any soil, but preferring peat, and easily propagated by division in spring. Pulmonarioides (virginica), the Virginian Cowslip, blue, May, 18 ins. high, is the principal species. Sibirica, with blue and white flowers in May, 1 ft., is also good; it is the same as Pulmonaria sibirica. Others are echioides, deep blue, likes semi-shade, 6 ins.; and oblongifolia, blue, 1 ft.

Mesembryanthemum, Fig Marigold, Ice Plant (me-sēm-bry-ăn-themum. Ord. Ficoideæ). A large genus of fleshy plants, producing flowers of great beauty. Crystallinum, whose leaves glisten and sparkle, is the Ice Plant; it is used for lines in carpet beds and for garnishing dishes. The majority of the species are grown in the greenhouse. They thrive in sandy loam with a third of leafmould and a little lime, and are propagated by cuttings taken with a heel, dried in the sun, and inserted in sandy soil. Coccineum, scarlet, July, 1 ft.; cordifolium variegatum, a variegated trailer useful for bedding; and pyropeum (tricolor), pink, May, 6 ins., are a few of the best.

Mespilus, Medlar (mĕs-pĭ-lus. Ord. Rosaceæ). Botanists now class

this genus with Pyrus. Germanica is the principal species; see Medlar. For the Japanese Medlar see Eriobotrya.

Meum (mē-um. Ord. Umbelliferæ). The only species is athamanticum, an herbaceous perennial, with aromatic roots, sometimes grown in gardens for its finely-divided leaves and white flowers. It will thrive in any good garden soil. Propagation is by division in spring. This plant is native in parts of Scotland, in Wales, and in Yorkshire.

Mezereon. See Daphne.

Michaelmas Daisy. See Aster (perennial) and Herbaceous Plants.

Michauxia (mĭ-châux-ia. Ord. Campanulaceæ). The species campanuloides is a fine hardy plant, with large white or pale pink Campanula-like flowers. It is not particular as to soil, and may be propagated by seed or division in spring. It grows about 4 ft. high, blooms in July, and is best treated as a biennial, fresh seed being sown every year in May for flowering the following year.

Microlepia. See Davallia.

Mignonette (Reseda odorata). A perennial grown almost exclusively as an annual, because it comes so readily, and flowers so quickly, from seed sown outside in spring. It is unnecessary to speak of its delicious perfume. Mignonette thrives well on limestone, and where it fails to bloom freely (a not uncommon trouble) lime may be added with advantage. Nice pots of Mignonette may be had by sowing about a dozen seeds in a 5- or 6-in. pot in spring, and successionally till September, thinning the seedlings to half a dozen. They should be given short stakes. The following are good varieties: Giant Red, Giant White, Giant Yellow, Golden Queen (dwarf), Rubin, red, Machet, Miles's Spiral; the last is good for pots.

Mildew. A fungus (or rather one of several fungi) which attacks Roses and other plants outdoors, and many plants under glass. Dusting with flowers of sulphur, preferably through a pair of small bellows, should be tried, or the affected plants may be sprayed with perfectly fresh liver of sulphur (sulphide of potassium), at the strength of 1 oz. in 2½ gallons of water for outdoor plants, and 1 oz. per 3 gallons for indoor plants. The liquid is green and foul-smelling, but harmless to vegetation. Ammonium polysulphide at the rate of 1 gallon to 50 gallons of water is another good remedy for mildew.

Milfoil. See Achillea.

Milk Vetch. See Astragalus.

Milkwort. See Polygala.

Milla (mĭll-a. Ord. Liliaceæ). Pretty bulbs allied to Brodiaeas. Biflora, with white flowers in spring, is the most popular species; it grows 18 ins. high, and is good for a cool greenhouse. Uniflora is now called Brodiaea uniflora. It has white flowers in early spring, height 9 ins.; violacea is a lilac variety. They like sandy loam, and are propagated by offsets.

Millipedes. Small, quick-moving, many-legged creatures belonging to the genera Julus and Blandulus. They do not hurt plants as a rule, but if they are present in large numbers, and injury at the root is suspected, pieces of Carrot may be impaled on sticks and inserted near the plants as traps to be examined daily. Or lime and soot may be scattered about. Regular hoeing is inimical to them, as is 2 oz. naphthalene per square yard scattered about.

Miltonia (mil-tō-nia. Ord. Orchidaceæ). Beautiful Orchids. The popular species vexillaria used to be known as Odontoglossum vexillarium. Its flat, roundish-oval flowers are borne freely in a warm greenhouse. The Miltonias should be grown in sandy, fibrous peat and Sphagnum moss. Propagation is by division when new growth starts, which is the best stage for repotting. Liberal supplies of water will be needed through the growing season, but little in winter. The principal Miltonias are candida, brown and yellow, summer, 18 ins.; grandiflora is a large variety; Clowesii, yellow, white, and purple; Roezlii, purple, white, and yellow, autumn, 1 ft.; Schroderiana, purple, brown, and yellow, late summer, 1 ft.; and vexillaria, white to rose, spring, 15 ins. There are many fine varieties, for which a modern work on Orchids should be consulted.

Mimosa, Sensitive Plant (mī-mō-sa. Ord. Leguminosæ). The species pudica, the only one grown to any extent, has the peculiarity of drooping its leaves when touched, and is therefore an object of interest. It is best managed as a tender annual, being raised from seed sown in a warm house or frame in spring. Loam, with a third of peat and some sand, suits it. It bears rose flowers in summer, but they are not particularly attractive. It should be noted that the " mimosa " of the spring markets does not belong to the genus Mimosa; it is Acacia dealbata.

Mimulus, Monkey Flower, Musk (mīm-u-lus. Ord. Scrophularineæ). The spotted Mimulus, tigrinus, is much grown as a bedding plant, being raised from seed in winter, planted out in summer, and discarded after blooming. It is a cheerful, showy plant, and has the advantage of thriving in shady places. There are several varieties of it. Cardinalis is a good scarlet species, height 18 ins.; cupreus, orange, 1 ft., is also good. Glutinosus (Diplacus glutinosus) has buff flowers and sticky leaves. It needs greenhouse culture. Although the spotted Mimuluses are perennials they are commonly grown as annuals. M. glutinosus should be grown as a perennial and propagated by cuttings. The Musk is Mimulus moschatus. It is a matter for regret that this popular old window plant lacks its old-time perfume. It can be raised from seed in spring in a warm house or frame, the seedlings pricked off, potted singly, and repotted as needed. A 5-in. pot is large enough for flowering, and with a small frame of slender laths the plant can be well displayed. When in bloom it may be stood in a room window. It may be further increased by pieces of root. Harrison's is a larger-flowered variety. Other species of Mimulus are radicans, white with violet blotch, 6 ins., and ringens, light blue, 1 ft.

Mina lobata. The same as Ipomaea versicolor which see.

Mint. This is Mentha viridis, a well-known kitchen herb. Few plants are more easily grown if a cool, semi-shaded position is selected; if the soil is moist and fertile all the better: it will then yield abundance of its aromatic leaves for many years. In less favourable circumstances it should be helped by cutting back the old stems every autumn, and giving a top-dressing of fresh soil. Plant in spring. For Cat Mint see Nepeta. For Horse Mint see Monarda.

Mirabilis, Marvel of Peru (mir-ăb-i-lis. Ord. Nyctagineæ). The species Jalapa, the Marvel of Peru, is a showy plant that was once a great flower-garden favourite. It is easily grown as a half-hardy

annual, being raised under glass in spring and planted out in June; but it is a perennial. It is not particular as to soil. As bought from seedsmen it gives several distinct colours, and the flowers are fragrant.

Miscanthus. See Eulalia.

Mistletoe, Viscum album (vis-cum. Ord. Loranthaceæ). This very interesting semi-parasite (it is not entirely parasitic, as it can make its own starch, stealing water and earth salts from the host) is a native of British woods. It was used in Druidical celebrations hundreds of years ago. It is supposed that birds have spread it by feeding on the berries and scraping their bills on the bark of trees. Those who wish to establish it may press the contents of a ripe berry on the underside of a branch towards the end of winter. In cool, moist places it takes readily to the Apple, Hawthorn, Lime, and Poplar. Although sentimentally associated with the Oak, in point of fact it prefers the Black Poplar and Apple, owing to their softer cortex. It is very slow in spreading on the Oak.

Mistletoe Cactus. See Cactus (Rhipsalis).

Mitchella (mĭt-chĕll-a. Ord. Rubiaceæ). The species repens is a hardy herbaceous creeper with white flowers in early summer and small red berries in winter. Sandy peat suits. The running stems may be layered for propagation. Plant in autumn or spring.

Mitella, Mitrewort (mi-tell-a. Ord. Saxifrageæ). A small genus, allied to Heuchera. The only species much grown is diphylla, a tufty plant with creamy flowers in spring, height about 6 ins. It is a charming object on the rockery, especially when grown in sandy loam with leafmould. Propagation is by division in autumn or spring.

Mitraria, Mitre Flower (mī-trā-ria. Ord. Gesneraceæ). The species coccinea is an evergreen shrub growing up to 4 ft. high in a favourable soil of sandy loam and peat, with shelter. Its charming scarlet flowers are produced in early summer. Not being perfectly hardy, it is often grown in pots for the greenhouse. Propagation is by ripened shoots under a handlight in summer.

Moccasin Flower. See Cypripedium spectabile.

Mock Orange. See Philadelphus and Shrubs.

Mole. The mole is a nuisance in gardens, as it burrows under beds and lawns, and throws up mounds of soil. The run should be found, a steel mole-trap set in it with gloved hands, and well covered to exclude light. A pinch of calcium cyanide in the runs is said to get rid of moles. It should be used by a responsible person, as it is poisonous.

Moly. See Allium Moly.

Monarda, Horse Mint, Bergamot (mon-ār-da. Ord. Labiatæ). The best-known species is didyma, the Sweet Bergamot, Bee Balm, or Oswego Tea. It grows about 18 ins. high, and has scarlet flowers in summer. There is a good form of it called Cambridge Scarlet. Fistulosa, the wild Bergamot, is grown occasionally. Ordinary soil. Propagation is by division in spring.

Moneywort. See Lysimachia Nummularia (Creeping Jenny).

Monkey Flower. See Mimulus.

Monkey Puzzle. See Araucaria imbricata.

Monkshood. See Aconitum.

Monoecious. Plants, such as Cucumbers, which produce separate male

and female flowers on the same plant are termed monoecious. See also Dioecious and Hermaphrodite.

Monocotyledons. Plants with only one seed-leaf, such as Wheat, Onion, etc. See also Dicotyledons.

Montbretia (mont-brē-tia. Ord. Irideæ). A quasi-bulbous plant which does well if bought and planted in autumn. The Montbretias are very useful, for they will thrive in almost any soil, and while they like a cool, rather shady place, with abundance of moisture, they will grow in most places, indeed, there are some in which they almost become weeds, encroaching too much. They form thick masses of long, narrow, Iris-like leaves, from the midst of which the flower-stems rise. They may be propagated by division in spring. Most of the sorts are yellow or orange in colour, and the flowers are borne in large quantities over a long period. George Davison, yellow; Germania, scarlet; Golden Sheaf, yellow; Pluie d'or, apricot; and Prometheus, orange, are good varieties; but new ones appear almost every year, and those interested should look out for them at the principal shows.

Monterey Pine. See Pinus insignis.

Monthly Rose. See Rosa indica.

Moon Daisy. See Chrysanthemum Leucanthemum.

Moonwort. See Soldanella.

Moraea (mō-rāe-a. Ord. Irideæ). Pretty plants resembling small Irises, suited for frame culture or a cool greenhouse. They thrive in sandy loam, and are propagated by division. Bicolor, brown and yellow, summer, 2 ft. (Iris bicolor), and edulis, violet, spring, 4 ft., are two of the most popular.

Morina. The species longifolia, a perennial, with purple flowers in summer, 2 ft. high, is worth growing on a warm rockery. Seeds can be sown under glass in spring and the plants hardened.

Morisia (mor-īs-ia. Ord. Cruciferæ). The species hypogaea is a pretty hardy plant, suitable for the rockery, bearing yellow flowers in May. It likes sandy loam, and is propagated by offsets or seeds. Growing only 3 or 4 ins. high, and with dense, bright green, much-cut foliage, it is a good carpeter.

Morning Glory. See Ipomaea.

Morus, Mulberry (mōr-us. Ord. Urticaceæ). The only important species are alba and nigra, respectively the White and Black Mulberries. See Mulberry.

Moss. For moss on fruit trees see Lichen. Much moss on lawns indicates acidity. Scratch well several times with a rake and dress with soil containing a heavy admixture of lime. 1 oz. sulphate of iron in 2 gallons of water destroys moss.

Moss Campion. See Silene acaulis.

Mosses. See Bryophyta.

Moss Fibre. See Bulbs.

Moss Rose. See Rosa centifolia muscosa.

Moss, Sphagnum. See advice as to use under many kinds of Orchid.

Mother of Thousands. See Saxifraga sarmentosa.

Moth Orchid. See Phalaenopsis.

Mould. See Soil and Mildew.

Mountain Ash, Rowan (Pyrus Aucuparia. Ord. Rosaceæ). This handsome tree, so beautiful in late summer and autumn with its

graceful foliage and brilliant fruit, is rightly popular. It will thrive on chalk and endure exposure. Nurserymen offer standard trees, 8 to 9 ft. high, at moderate prices for planting from November to March inclusive. The staking should be secure. There are weeping and variegated forms, also a yellow-fruited variety. This handsome tree may remain an object of beauty with its fruit throughout the autumn. On the other hand, its beauty may be spoiled by a sudden and violent attack on the berries by birds—fieldfares in particular.

Mountain Avens. See Dryas octopetala.

Mournful Widow. See Scabious.

Mouse-ear Chickweed. See Cerastium.

Mowers and **Mowing.** In our remarks on grass (see Grass and Lawns) we laid stress on the importance of mowing. In the past this was one of the most laborious of the gardener's duties, but nowadays motor mowers are used in almost all large and many comparatively small gardens. We have had intimate experience of several of the principal makes, and they are so good, and the repairing service so thorough, that no one need hesitate to use them. Ordinary hand-driven mowers have also been improved, better methods of adjustment having been provided. It should be remembered, however, that the best of mowers need regular attention, particularly in the cleaning and oiling. Cleaning is reduced to a minimum if the grass is only cut when dry, but that is not always practicable. Amateurs frequently neglect regular oiling with bad results. An annual sharpening by an ironmonger is desirable. People who are not robust should never use a mower larger than 12-in.; a good 10-in. in perfect condition will do a square rod in about five minutes with a willing person behind it, always provided the grass is not unduly coarse, long, wet, or clogged with broad-leaved weeds.

Muehlenbeckia (mueh-len-beck-ia. Ord. Polygonaceæ). The only species much grown is complexa, a rambling shrub with wiry purple stems and white flowers late in summer. It likes a loamy soil. Propagation is by cuttings inserted in sandy soil under a handlight in early summer. Plant in autumn or spring.

Mulberry, Black (Morus nigra). An interesting tree, the acid fruit of which is found agreeable by many people. As is well known, the leaves are used for feeding silkworms, but for this purpose the species alba (White Mulberry) is better than the black. The latter will thrive in any deep, fertile soil, but does not care for dry, shallow ground. It may be planted in autumn, and propagated by layers or cuttings of young wood, if increase is desired. It is rarely that the Mulberry is cultivated as a fruit, except in large places; it is generally planted to form an ornamental tree, and the fruit is considered a pleasant side issue. But if cultivated for the fruit, it should be restricted to a limited number of branches and spur-pruned. The Mulberry is a suitable tree for the outskirts of a large lawn, but should not be planted close to a path or house, where the falling fruit may be messy. Interest will be found in observing the late, slow opening of the buds in spring, and the rapid fall of the leaves after frost in autumn.

Mulching. To " mulch " soil is to cover the surface with a light coating of manure, cocoa-nut fibre, or grass, with the object of conserving

moisture by checking evaporation. A mulch of manure also feeds the crop near which it is placed.

Mullein. See Verbascum

Muscari (mus-cā-ri. Ord. Liliaceæ). These pretty bulbs include the Grape Hyacinth (botryoides), the Feather Hyacinth (comosum monstrosum), and the Musk Hyacinth (moschatum). They are all easily grown in borders and rockeries. Botryoides, and its white variety alba and fine blue form Heavenly Blue, are particularly charming on the rockery in spring. Or they may be grown in pots or bowls of fibre. Azureum Freynianum, with blue flowers in February, is charming on a carpet of Saxifrage on the rockery. Plant in autumn a few inches apart.

Mushroom (Agaricus campestris). Although the Mushroom is not a vegetable, but a fungus, it is generally included in kitchen-garden crops, and often occupies, for part of the year, frames that are utilised for other things at earlier or later periods. In large establishments a " Mushroom house " is not an uncommon adjunct to other horticultural buildings, and it consists of a thick-walled, dark place, with pipes running through it. But Mushrooms are often grown in sheds, and still more largely in the open air. Heat and darkness are the two principal requirements, and with abundance of fresh stable manure at command there is no difficulty in getting sufficient warmth outdoors.

Preparing Manure. The manure must be well turned and shaken out on 3 or 4 successive days in order to sweeten it. When fresh from the stable it heats violently, and the gases emitted are foul, but after repeated turnings the heat becomes subdued and the material pleasant to the nostrils. At this stage it should be built into a firm bed 30 ins. wide at the bottom, sloping up to 6 ins. at the top. The manure must be briskly trodden in order to get it quite firm. When the bed is finished a thick stick should be thrust in here and there, and left for a few hours, then drawn out and tested for heat with the hand. If very hot wait a day. At the second testing the stick may be still hotter, in which case wait another day. Not until the heat of the stick can be borne should the bed be spawned.

Spawn and Spawning. Seedsmen supply spawn in flat cakes or " bricks," which should be broken up into pieces about the size of hens' eggs, and thrust far enough into the bed to be hidden. The bed should then be plastered completely over 1 in. deep with moist, loamy soil, and finally covered with about 1 ft. thickness of straw. White threads will run from the spawn, form Mushrooms, and pierce the soil, growing above in thick clusters, from which they should be broken as they become large enough for use. When grown under cover, less manure and straw will be needed, as the necessary heat and darkness can be secured with a smaller quantity of materials.

Musk. See Mimulus moschatus.

Musk Hyacinth. See Muscari moschatus.

Mustard. See Cress for Mustard as a salad. For Mustard as a manure see Manures: Green.

Myosotidium, New Zealand Forget-me-not (mȳ-ō-sō-tid-ium. Ord. Boragineæ). The only species, nobilis, has blue and white flowers in spring, height 18 ins. It is a pretty herbaceous perennial, suitable

for the rockery, where it likes a cool, shady spot and a peaty compost. Propagation is by division in spring.

Myosotis (mȳo-sō-tis. Ord. Borragineæ). Pretty enough in itself, the Forget-me-not is also charming as a groundwork for Tulips and other taller plants. See Beds and Bedding-out. Every spring gardener knows and appreciates it, and not less because it costs so little, and gives so small a modicum of trouble.

Propagation. Sown in any reserve spot in early summer, the seeds germinate readily and the plants are ready for transplanting in autumn. The clumps can be split up if desired in order to increase the stock, as small pieces soon spread into large ones. The limestone gardener will come into his own with the Forget-me-nots, for they are never more brilliant and beautiful than on the chalk.

Species and Varieties. Dissitiflora and its variety Perfection are popular Forget-me-nots. The best forms for bedding with bulbs are varieties of the species alpestris (rupicola), such as Royal Blue, Queen Victoria, and Star of Love. Growing only 6 ins. high, they are of dense habit and clothe themselves with beautiful rich blue flowers, which last well into early summer, but lose their depth of colour when the hot weather comes. Azorica and dissitiflora are good for the rockery; the former can be flowered the first year from seed if sown in spring. For the waterside, palustris and its variety grandiflora are the ones to choose. Caespitosa Rehsteineri, blue, 3 ins., also likes moist conditions. Truly an accommodating genus, thus to thrive under conditions so different as the limestone bank and the pool.

Myrica, Candleberry Myrtle, Sweet Gale, Bog Myrtle (mȳ-ri-ca. Ord. Myriaceæ). Only 2 species are grown to any extent, namely cerifera, the Candleberry Myrtle, a hardy shrub with toothed shining leaves and white flowers in May, followed by waxy fruits, height 6–8 ft., and Gale, the native Sweet Gale or Bog Myrtle, a fragrant shrub with silky leaves and greenish-brown flowers in early summer, height 2–3 ft. Asplenifolia (Comptonia asplenifolia), 3–4 ft., has fragrant leaves. They like peat. Propagation is by layers or suckers in autumn. Plant in autumn or spring.

Myricaria. See Tamarix.

Myrobalan Plum (Prunus cerasifera). See Hedges, Plum, and Prunus.

Myrtus, Myrtle (mȳr-tus. Ord. Myrtaceæ). Handsome evergreen shrubs, grown mainly for their aromatic foliage. They are good for growing in tubs to stand on large verandas and in spacious conservatories. The common Myrtle, communis, may be grown outdoors in sheltered places. Loam, with a third of leafmould and some sand, suits. Propagation is by cuttings under a bell-glass in early summer. There are many varieties of the common Myrtle, of which Belgica, flore pleno (double), and variegata may be mentioned. Ugni, pink, is the same as Eugenia Ugni.

N

Nandina (nan-dī-na. Ord. Berberideæ). The only species grown is domestica, an evergreen shrub with white flowers in which the yellow anthers are conspicuous, followed by red fruits the size of Peas, height about 5 ft. Being of imperfect hardiness, it should have a sheltered place. Loam, with peat and leafmould, suits it. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in autumn or spring.

Narcissus (nar-cĭss-us. Ord. Amaryllideæ). As we saw when dealing with Daffodils, the two names are used almost indiscriminately for the same flowers, although the popular name "Daffodil" properly belongs to the trumpet-shaped section alone.

The Polyanthus or Bunch-flowered group (N. Tazetta) are generally called Narcissi, as are the Poet's (N. Poeticus or Pheasant's-eye and forms, including the double, which is sometimes called the Gardenia Narcissus), the Paper White (Polyanthus), and the Double Roman (also Polyanthus). The incomparabilis group, including Barrii, Burbidgei and Leedsii, are commonly called Star Narcissi.

For garden purposes it is unnecessary to labour the question of the names, and in order to avoid repetition we have dealt with the flower under Daffodil, which see.

Nasturtium (nas-tūr-tium. Ord. Cruciferæ). The Nasturtium of flower gardens has no right to the name, which belongs to the Water Cress, Nasturtium officinale. The annual Tropaeolum was called, owing to its pungency, Indian Cress, and one cress being the same as another to the people, the name Nasturtium came into use for a Tropaeolum. T. majus is the so-called Climbing Nasturtium and T. minus the dwarf or Tom Thumb. People other than botanists will doubtless continue to call the flowers Nasturtiums and no great harm will follow. Seedsmen now offer both classes in many distinct colours. They also offer variegated-leaved dwarf Nasturtiums. It is scarcely necessary to say more than that any or all may be sown outside in spring for flowering in summer; but it may be added that a very rich soil is undesirable. See also Tropaeolum.

Navelwort. See Cotyledon umbilicus. Venus's Navelwort is Omphalodes linifolia, which see.

Neapolitan Violet. See Violet.

Necklace Poplar (Populus monilifera). See Poplar.

Nectarine. See Peach.

Negundo. See Acer Negundo.

Neillia (nēill-ia. Ord. Rosaceæ). A small genus of deciduous shrubs, resembling Spiraeas. The species most grown is opulifolia, with white flowers in early summer, followed by purple fruits, height about 5 ft. The variety lutea has yellow leaves. Any good soil

suits. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in autumn or spring.

Nelumbium (ne-lūm-bium. Ord. Nymphaeaceæ). The Sacred Bean or Egyptian Lotos, N. speciosum, is a beautiful aquatic, with white, red-tipped, fragrant flowers in summer. There are many varieties of it, such as large white (album grandiflorum), double white (album plenum), striped white (album striatum), double rose (roseum plenum), and Osiris, red. It has edible nuts. N. luteum has yellow flowers, and is also sweet. The Nelumbiums are not hardy, and should be grown in a shallow tank in a cool house. The roots may be packed in loam and bound round with moss. Planting should be done in late spring, when growth starts, at which stage crowded clumps may be propagated by division.

Nemesia (ne-mē-sia. Ord. Scrophularineæ). This genus includes both annuals and perennials, but the only species much grown in gardens is strumosa, the form of which called Suttoni is a beautiful half-hardy annual, of several colours. It is good both for pots and beds. There are few more brilliant and useful half-hardy annuals than the Nemesia, and everybody should grow it. Seed is obtained of two types, the Large-flowered and the Dwarf Hybrid, both in distinct colours as well as in mixture. Blue Gem and White Gem are charming members of the dwarf set.

Propagation. Whether for pot or garden decoration Nemesias may be sown like half-hardy annuals (see Annuals) in pans or boxes containing plenty of leafmould, in February, with gentle heat, and pricked off 3 ins. apart into other boxes when they begin to crowd. Thence they can be transferred to 5-in. pots, or to the garden in May, as required. They make lovely beds, lines, and clumps, if set 9 ins. apart. They are easily bruised when young, and should therefore be handled carefully. Moreover, they are shallow rooters, and care must be exercised in weeding, or a plant in full beauty may be uprooted. Well-grown plants remain in beauty many weeks. The orange and salmon Nemesias look charming under orange-coloured Roses.

Nemophila (ne-mŏf-ila. Ord. Hydrophyllaceæ). Pretty dwarf hardy annuals, of which the blue and white species insignis, 6 ins. high, is the most popular. Sow outside in ordinary soil in April or September and thin. There are several varieties of insignis, including alba, a white. Maculata, white, with violet blotches, is good. Atomaria of seedsmen (Menziesi of botanists) is also speckled; discoidalis is a white variety of it, with purple zone.

Nepenthes, Pitcher Plant (ne-pĕn-thes. Ord. Nepenthaceæ). These remarkable insectivorous plants have long, slender, drooping stems, which terminate in hollow, urn-like vessels provided with a cap or lid and containing water. They are consequently well termed Pitcher Plants. The pitchers vary in size and colour. The plants are hothouse evergreens, best grown in suspended teak baskets, as then the pitchers are seen to advantage. A compost of loam, peat, and Sphagnum moss, with sand, crocks, and charcoal, suits them. Rebasketing should be done towards the end of winter. Throughout the summer they will enjoy abundance of water and should be syringed daily. In autumn and winter less water will be needed; with a minimum temperature of 60°. The following are good

sorts: albo-marginata, green, white ring; Curtisi, green, spotted crimson; Rafflesiana, green, spotted brown; Rajah, purple, and sanguinea, red.

Nepeta, Cat Mint, Ground Ivy (ne-pē-ta. Ord. Labiatæ). The variegated form of the native Ground Ivy, N. Glechoma, is worth growing. It is a pretty dwarf plant, with small Ivy-like leaves and dark-blue flowers, good for basket culture. Mussini, a taller plant with violet flowers, is, however, more important. This has come into great favour for the flower garden during recent years, because of its freedom and duration of bloom, and its uncommon colour. It is used for borders, also for planting under standard Roses. The height is about 2 ft. It will thrive in almost any soil, and is increased by division in spring. Other good species are grandiflora, blue, grey foliage, 4–6 ft.; and macrantha, blue, 18 ins.

Nephrodium (ne-phrō-dium. Ord. Filices). An immense genus, containing hundreds of species, some of considerable importance. The genus Lastrea has been added to it. Some of the species are hardy, while others need a greenhouse, and others again a hothouse. Those species with creeping rhizomes may be propagated by divisions in spring, the others by spores (see Ferns for propagation and soil).

Principal Species. Aemulum, the Hay-scented Buckler Fern; var. ramosum is good. Cristatum, the Crested Shield Fern, many varieties, enjoys peat and a boggy site. Decompositum and its variety, glabellum, are good. Erythrosum is an excellent room fern. Filix-mas, the Male Fern, has scores of varieties. Lepidum is a graceful fern, suitable for table decoration, but should be propagated frequently to get young plants. Molle is a popular market fern; the variety corymbiferum is nicely crested. Montanum, the hardy Mountain Buckler Fern, may be grown on the rockery; vars. Barnesii and cristatum are good. Spinulosum is the Prickly Shield Fern; var. dilatatum has many good forms, such as crispum, Howardiae, and Stansfieldii; Thelypteris is the Female Buckler Fern. There are numerous others.

Nephrolepis (nephro-lē-pis. Ord. Filices). Graceful ferns, mostly evergreens of pendent habit, and consequently suitable for culture in baskets. Davallioides and its varieties furcans, furcans plumosa and multiceps, are particularly good for this purpose; they like a warm house, and may be propagated by rhizomes. Bausei and cordfolia are also popular, and may be propagated by the tubers which they produce; the former is deciduous. Exaltata is a good species for a hothouse. Those that produce spores may be increased by that means. Loam, with a third of leafmould, and sand, suits. The evergreens must be given a little water in winter, and they will take large quantities, both at the root and overhead, in summer.

Nerine (ne-rī-ne. Ord. Amaryllideæ). A beautiful genus of half-hardy and tender bulbs, suitable for cool houses or for warm, sheltered places outdoors in mild districts. The brilliant, glistening flowers are borne in umbels in late summer or early autumn. Increasing slowly, and being impatient of disturbance, they are rather more expensive than the majority of bulbs, but the rates are not exorbitant. Nerine (Amaryllis) sarniensis, the Guernsey Lily, is one of the most beautiful of the genus, and there is a large trade done in it in late summer, the plants being bought with Belladonna Lilies

and Roman Hyacinths in August, when the flower-spikes are rising from the bulbs. Nerines make their growth after blooming, and should be watered until they show signs of going to rest in spring, when they should be dried off for the summer. Loam, with a fourth of leafmould and some sand, suits them. It is best to leave them in the same pot until they get very crowded, as frequent shifting is bad. The older Nerines, such as Bowdeni, pink, nearly hardy; Fothergilli major, salmon-red; flexuosa, pink, and its white variety, alba; and Moorei, scarlet, have now given place, to some extent, to new hybrids and varieties, of which many are offered under names by the larger bulb-dealers.

Nerium, Oleander, Rose Ray (nē-rium. Ord. Apocynaceæ). The Oleander is a well-known shrub, grown in large pots or tubs for the sake of its beautiful double pink flowers. It is not difficult to manage, but it is what gardeners term a dirty plant, that is, one much subject to the attack of insects (see Aphides). It must be kept clean by regular fumigation or sponging, or it will soon fall into bad health. Propagation is by cuttings in sandy soil under a bell-glass, or in bottles of warm water in spring. Loam, with a fourth of peat and some sand, suits. Repotting should be done in spring. After flowering, the shoots may be trimmed and less water given to afford a rest. There are several named varieties, differing in hue, but few people specialise the plant. It is poisonous.

Nertera depressa, Bead Plant (ner-ter-a. Ord. Rubiaceæ). A pretty little plant, the great charm of which is the abundance of red berries, which nestle in the leaves just above the ground. It is a nice creeper for the rockery, but is not quite hardy. Carpet-bedders were wont to make use of it in the old days. Some gardeners establish it on the trunks of tree ferns. Propagation is by division or seeds. Sandy soil.

Netting. A supply of tanned fish-netting should always be kept in gardens, as it is useful for protecting seedlings and fruit from birds, and in protecting fruit blossom on wall trees from frost.

Neviusa (nev-i-ū-sa. Ord. Rosaceæ). The only species is alabamensis, a deciduous shrub with toothed leaves and white flowers devoid of petals, height about 5 ft. in good loamy soil. There is a doubt of its hardiness and it should be given a sheltered place. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in autumn or spring.

New Zealand Flax. See Phormium tenax.

New Zealand Spinach. See Spinach.

Nicotiana, Tobacco (nĭ-cō-tiā-na. Ord. Solanaceæ). The genus Nicotiana is important economically because from the leaves of the species Tabacum is prepared tobacco. Nor is it unimportant from the garden point of view, because it contains several useful garden plants, notably affinis, height 2½ ft., which produces sweet white flowers in abundance; Sanderae, a plant of somewhat similar habit to the latter, but taller and with rose or magenta flowers; and sylvestris, which grows 4 ft. high, and bears white flowers. Affinis and Sanderae are best treated as half-hardy annuals, being sown in gentle heat in February, pricked off into boxes, and set out in May, Sanderae 2 ft. apart. The latter is in bloom for several months, but is less showy in hot sunlight than in the evening. Sylvestris may be treated

as a hardy perennial. **Tomentosa** (colossea) is sometimes grown for its handsome foliage.

Nicotine. A valuable insecticide. Nicotine extract of the 95–8 grade is particularly useful in conjunction with soft soap. The proportions may be 1½ oz. extract, 2½ lb. soft soap, 20 gallons of water. The soft soap should be boiled in a gallon of water, the extract added, and the remaining water added slowly while hot. The mixture should be used as a fine spray with face-protectors, and is efficacious against aphides, red spider, thrips, etc. Nicotine extract is often added to Bordeaux Mixture (which see) used for Brown-rot, Sucker, Scab, etc., when aphides are also present. See also Apples: Enemies, and Plum: Enemies.

Nierembergia (nē-rem-bēr-gia. Ord. Solanaceæ). The species gracilis is generally grown as a half-hardy annual (for culture see Annuals); it has white flowers, streaked with purple, in summer, and grows about 9 ins. high. It likes sandy loam and abundance of water. Rivularis is a white-flowered creeper, suitable for pot culture or moist parts of the rock garden.

Nigella, Love-in-a-mist, Devil-in-the-bush (nī-gell-a. Ord. Ranunculaceæ). Pretty, hardy annuals. Damascena is the blue Love-in-a-mist, 18 ins. high, a fine blue variety of which is Miss Jekyll; there is also a white and a double. Hispanica, the Devil-in-the-bush, has flowers of purplish brown, and is quaint rather than showy. Sow outside in spring in ordinary soil and thin to 9 ins. apart.

Night-scented Stock. See remarks under Matthiola.

Nitrates. Free nitrogen is not available for plants, and cannot benefit them until combined with a mineral to form a nitrate. Nitrate of soda is a popular form. Nitrolim (calcium cyanamide), sulphate of ammonia, and nitrate of potash also yield nitrogen. See Manures.

Nitrification. The process by which non-available nitrogenous matters are converted into compounds that can be taken up by the roots of plants. The process is performed by bacteria, which multiply the most freely in moist, warm, well-drained, friable soil. The object of the gardener should therefore be to improve the mechanical condition of his soil.

Nitro-bacterine. A laboratory culture of the microbe Pseudomonas radicicola, which takes free nitrogen from the atmosphere and stores it in the form of nitrates in the root-nodules of leguminous crops, such as Peas. Experiments conducted by the Royal Horticultural Society threw grave doubts on the value of the preparation, and it is little used nowadays.

Nolana (nō-lā-na. Ord. Convolvulaceæ). Seedsmen offer atriplicifolia, a beautiful annual trailer with blue and white Convolvulus-like flowers showing zones of lemon and white when expanded. Sow outside in spring in a sunny spot in ordinary soil.

Norfolk Island Pine. See Araucaria excelsa.

Norway Maple (Acer platanoides). See Maple.

Norway Spruce. See Picea excelsa.

Nothoclaena, Gold and Silver Maidenhairs (nothō-clē-na. Ord. Filices). There are a few very useful ferns included in this genus, notably affinis, a hothouse species; Marantae, which also likes a warm house; sinuata; and trichomanoides, white, powdery fronds, a good basket plant. They may be propagated by spores (see Ferns), or

division of the crowns in spring in the case of those with tufty habit. Peat, with pieces of sandstone and charcoal, suits. They must have plenty of water in the soil during the growing season, but not overhead. A light, airy position is desirable.

Notospartium (nōtō-spār-tium. Ord. Leguminosæ). The only species much grown is Carmichaeliae, a Broom-like shrub or small tree with slender branches and pink flowers in summer, height 15 to 20 ft. in good soil and in a sunny sheltered place. Propagation is by cuttings inserted in sandy soil under a handlight in summer, or by seeds in a frame or greenhouse in spring. Plant in autumn or spring.

Nucleus. The dense mass of protoplasm which governs the cells of plants.

Nuphar, Yellow Water Lily, Brandy Bottle (nū-phār. Ord. Nymphaeaceæ). Nuphar luteum is a hardy British plant, with yellow flowers in June. It may be established in a pond by binding loam and moss round the roots, and weighting with a stone to sink the mass. Propagation is by division in spring. Advena also bears yellow flowers in summer.

Nut (Corylus Avellana). The cultivated nuts are much superior to the wild forms, and are well worth growing in gardens where the soil is suitable. They like a rich, friable loam, with limestone below, and do not care for poor dry ground. The Filbert is the most popular, and of this class Lambert's variety is one of the best. Cobs differ slightly from Filberts, but like the same soil and treatment.

Fertilisation. Nuts require a little study to get the best results, as they produce two distinct forms of flower. One, the nut-bearer, is a small pink blossom with a swelling at the base; the other, the male, is a long yellow catkin, and bears the pollen, which is ripe and loose late in winter. The female flowers are borne on short side shoots, and pruning should not be done until the pollen has spread, except where the bushes are thick, in which case they should be thinned at any convenient time in winter. The grower need not be afraid to sacrifice a little fruit blossom at this thinning; bushes are never more productive for being crowded.

Training. The young plant is pinched back to induce it to push side shoots until about a dozen have been secured that are well placed round the centre, and then these extend as main branches. No central growth is taken up. Side shoots push from the main branches, and few or more are retained according to space.

Propagation. By suckers and layers. The former, which are basal shoots, are drawn away from the root and planted, the lower buds being removed to leave a clear stem. In the case of layers, young shoots about 2 ft. long are drawn down horizontally, and the lower part pegged to the ground. It facilitates rooting if they are partially cut through. When rooted they are transplanted, and the lower buds removed, as in the case of the suckers, leaving, however, sufficient to form the first set of side branches when the head is removed.

Weevil. The nut weevil must be kept in check. It appears in May, and pierces the young nut. When full-fed it turns into a chrysalis and lies buried in the ground throughout the winter. If any weevils are seen, spray with arsenate paste, ½ oz. per gallon of

water; or put tarred boards beneath the bushes and shake the weevils off.

Nuttallia (nutt-āll-ia. Ord. Rosaceæ). The one species, cerasiformis, is a Californian shrub, with white drooping flowers, which appear in spring in advance of the leaves, 4 to 6 ft. high in good loamy soil. As the growth starts early, it is liable to be injured by spring frosts in exposed places and should therefore have shelter. Propagation is by layers or suckers in autumn. Plant in autumn or early winter.

Nycterinia (nŷc-ter-ĭn-ia. Ord. Scrophularineæ). Seedsmen offer Nycterinia selaginoides, a dwarf half-hardy annual with white perfumed flowers in summer, 9 ins. high; also capensis, blue and white, 6 ins., but botanists do not keep up the name. For culture, see Annuals—Half-hardy.

Nymphaea, Water Lily (nŷm-fe-a. Ord. Nymphaeaceæ). Beautiful aquatics, the modern hybrid forms of which are well worth growing, either in shallow ponds, pools, or tubs. The roots may be packed in soil in an old basket, weighted to carry it to the bottom of the water, which may be from 1 to 2 ft. deep. They will soon establish themselves. See Water and the Sunk Garden for details and selections of varieties. Nymphaea leaves sometimes become infected with the fungus Ranularia Nymphaearum. Such leaves should be removed and burned. The water should be changed the following spring.

Nyssa, Tupelo Tree, Pepperidge (niss-a. Ord. Cornaceæ). The only species of note is sylvatica (villosa), with oval leaves which colour splendidly in autumn, when it becomes highly ornamental. The flowers are not particularly attractive, but the blue fruits that follow add to the interest of the tree. It likes a deep, moisture-holding soil, in which it may grow 15 to 20 ft. high. Plant in autumn or spring.

O

Oak. Too large a tree for most gardens, the Oak, Quercus Robur, is nevertheless of interest to nature-lovers, because of its fine effect in park and forest. It is, of course, important as a timber tree. The Oak likes a deep, moist, substantial soil, and is at home on the Weald of Kent and on other clays. For details of species and varieties see Quercus.

Oak-leaved Geranium. See Pelargonium quercifolium.

Obeliscaria. The species pulcherrima of seedsmen is the same as Rudbeckia Drummondi. See Rudbeckia.

Ocimum Basilicum. See Basil and Herbs.

Odontoglossum (ōdŏn-tō-glŏss-um. Ord. Orchidaceæ). A large and beautiful genus of Orchids. Some of the best kinds will thrive in cool houses, and are inexpensive.

Crispum (*Alexandrae*). This is the most popular of all. Many forms are as cheap as Fuchsias, although the rarer ones are dear. At least 100 forms of this species alone could be named, all of which would be acknowledged by experts as good. Like most of the Odontoglossums, it is a moisture-loving Orchid, and must never be kept dry at the root, even in the winter. In summer there must be abundance of root and atmospheric moisture. The plants are grown in pots, in a compost of peat and Sphagnum set on a base of crocks that two-thirds fills the pot. The pseudo-bulbs should be above the brim of the pot. When new roots show towards the end of summer is a good period for repotting, or it may be done at the end of winter. A minimum winter temperature of 45° will suffice, and this can be maintained without hard firing if the house is adequately piped (see Greenhouses: Heating). In hot summer weather steps must be taken to prevent the plants suffering from excessive sun heat, and an arid atmosphere by providing abundant ventilation, by shading, and by damping all surfaces. The plants themselves should not be syringed.

Other Species. Citrosmum, rose, white, and yellow, sweet, several varieties; Edwardi, purple and yellow, sweet; grande, yellow and brown, very large and brilliant, several varieties; Hallii, yellow and chocolate, many forms; Harryanum, brown, white and yellow, several varieties; luteo-purpureum, yellow and brown, many varieties; maculatum, chocolate, yellow and white, several varieties; nobilis (Pescatorei), white, spotted red, many forms; pulchellum, purple, yellow and white, sweet; Rossii, white, spotted brown (with variety majus), and several others; triumphans, yellow and brown, several varieties; and Uroskinneri, yellow and brown. For detailed treatment of particular species and for the best modern forms see a good modern work on Orchids.

Vexillarium is now known as Miltonia vexillaria (see Miltonia).

Oenothera, Evening Primrose (ē-nō-thē-ra. Ord. Onagrarieæ). Popular and brilliant flowers, not all exclusively night bloomers. They are useful border plants, as they will thrive in most soils, are hardy, and bloom freely. The biennials are propagated by seed, the perennials by seed and also by division, preferably in spring. All bloom in summer, and have yellow flowers except where otherwise stated.

Principal Species. Biennis, a biennial, 3 ft. high, grandiflora (Lamarckiana) is a large variety of it; caespitosa (eximia, marginata), white, 1 ft., a perennial; fruticosa, shrubby, 3 ft., Youngii is a splendid variety of it; glauca, 3 ft., a perennial, Fraseri is a good variety; missouriensis, a yellow perennial trailer; speciosa, white, 2 ft., a perennial; and taraxacifolia (acaulis), white, a trailer, beautiful, but not hardy, variously described as a biennial and a perennial, but may be treated as an annual, the seed being sown outside in spring.

Old Man. See Artemisia Abrotanum.

Old Man Cactus. See Cactus (Pilocereus senilis).

Old Man's Beard. See Clematis Vitalba.

Olea. See Osmanthus.

Oleander. See Nerium.

Olearia, Daisy Tree (ō-lē-ā-ria. Ord. Compositæ). Useful evergreen shrubs. Haastii, which is a dense grower, is hardy, and has attractive white flowers in summer, is particularly good, and may be planted 4 ft. apart in autumn. It grows 4 to 5 ft. high. It is not very particular as to soil, if not stiff and wet. Ilicifolia, also with white flowers, is Musk-scented. Macrodonta is handsome with its silvery leaves, but not quite hardy. Stellulata (Gunnii, Gunniana, Eurybia Gunniana) has beautiful white flowers, not quite hardy. Other species are angustifolia, white, sweet, narrow leaves; argophylla, white downy scented leaves; Forsteri, white, not hardy; and Nummularifolia, white, hardy. Propagation is by seeds in a frame in spring, cuttings of mature wood under a handlight in summer, and by layers in autumn. Kinds of doubtful hardiness should be grown on sheltered borders.

Omphalodes, Navelwort (ŏmpha-lō-des. Ord. Boragineæ). A small genus, comprising one or two very pretty hardy herbaceous plants. Linifolia, a hardy annual, with white flowers, is the Venus's Navelwort; it grows about 9 ins. high. The same popular name is often applied to verna, a dwarf spring-blooming perennial with blue flowers in March. Luciliae is a charming blue summer-blooming alpine for rockeries. Cappodocica, rich blue, 9 ins., is one of the best for the rockery. They can be raised from seeds in spring, the perennials also by division. They are not particular as to soil.

Oncidium (ŏn-cĭd-ium. Ord. Orchidaceæ). A large and attractive genus of Orchids, comprising some 300 species, with a large number of varieties and hybrids. They are allied to the Odontoglossums, and the cultural remarks made under that subject apply to Oncidiums, but the species which have leathery leaves need less water when the growth is complete, and only enough should be given to keep the pseudo-bulbs from shrivelling.

Principal Species. Concolor, yellow, May bloomer, cool house; crispum, brown, summer and winter, cool house; Forbesii, brown, margined yellow, autumn, cool house; Kramerianum, brown and

yellow, spring, hothouse; macranthum, spring, brown, purple, white, and yellow, cool house; Marshallianum, yellow and brown, summer, cool house; papilio, red and yellow, spring, hothouse; Phalaenopsis, white, purple, and violet, cool house; sarcodes, brown and yellow, spring, intermediate house; and tigrinum, yellow, barred brown, cool house.

They differ a good deal in respect to heat requirements, and anyone who desires to grow a collection should consult a special modern work on Orchids, alike for details of treatment and particulars of modern kinds.

Onion (Allium cepa). As a component of soups and stews the Onion is admittedly almost indispensable, while many people give it the rank of a major vegetable, and also use it in salads. For the latter purpose, a white, mild variety, such as White Lisbon, should be chosen and sown in August; another sowing may be made in spring. It is customary to sow a larger, stronger-flavoured sort in August, and transplant in autumn or spring to yield large bulbs before the spring-sown crop is ready. Varieties so treated are classed as "Autumn Onions."

Sowing. For the main crop it suffices to sow when the ground becomes dry enough to crumble in February or March. A piece of soil is dug deeply or bastard-trenched, and manured liberally. The surface is crumbled up, dusted with soot, and then trodden quite firm. A little soil for covering is scratched up with the rake, and the seed is sown thinly in lines 1 ft. apart. After sowing, the seed is covered, the bed well trodden, and the surface lightly raked over. This treading should not be carried to extremes in stiff, heavy, wet soil, or the seedlings may fail. The plants are subsequently thinned till just clear of each other, severe thinning being avoided. However, it is a real advantage to have boxes of sturdy plants of such fine varieties as Premier, Ailsa Craig, and A1 ready for planting in special beds in April—beds, that is, which have been deeply trenched and heavily manured. The bulbs generally grow to at least double the size of those sown out of doors, and what is even more important, they generally escape bad attacks of the destructive maggot. With heat, the seeds may be sown in January or February, and the plants hardened in an unheated frame in March. If there is only an unheated frame or greenhouse, the seed may be sown in February. In this case the plants will not be so large as in the other, but they will give an appreciably heavier crop than those sown outdoors.

Prize Bulbs. Growers for show generally bastard-trench their ground (see Bastard-trenching) and manure heavily. Moreover, they raise strong plants in boxes in winter and plant out 1 ft. or more apart in April or May.

Enemies. It is well to spray the plants with soft soap and paraffin oil in solution (see Paraffin) when they are 2 or 3 ins. high, in order to keep off the Onion fly, which otherwise will lay eggs on the leaves in May, and grubs, hatching therefrom, will work their way to the bulbs and destroy the plants. Thereafter the plants will grow steadily until mid-June or July, when they are subject to the attack of a mould or mildew. This must be checked at the first trace by spraying with liver of sulphur, ½ oz. per gallon of water.

Harvesting. In August the tops may be broken over to check

growth, and a fortnight later the bulbs may be pulled up and left in the sun to dry. When fully ripe they may be strung together and hung up in a dry, cool shed, or even on an outside wall.

Useful Standard Varieties. A 1, Ailsa Craig, Bedfordshire Champion, Giant Rocca, James's Keeping, and White Spanish. See also seedsmen's specialities.

Potato or Underground Onions. These have mild flavour, and are grown from bulbs in the same way as Shallots, which see; they do not keep long.

Tree Onion. An interesting plant, bearing offsets at the top of the stem, by which it may be increased if desired.

Welsh Onion (Allium fistulosum). Mainly grown for its leaves, like Chives (which see). The leaves of both plants are used for flavouring.

Onoclea (ōnō-clē-a. Ord. Filices). A small genus of hardy ferns, the finest member of which is germanica, the Ostrich Fern, also known as Struthiopteris germanica. This is a noble plant for a sheltered place near the margin of a stream, where its stoloniferous roots can ramble in moist soil. It can be propagated by divisions of these roots. Sensibilis is a much smaller species, growing only about 2 ft. high.

Ononis, Rest Harrow (ō-nō-nis. Ord. Leguminosæ). Two or three shrubby members of this large genus are worth growing in the rock garden, notably arvensis, the Rest Harrow, which produces rose and white flowers in summer on stems a few inches high; fruticosa, purple, summer, 2 ft.; rotundifolia, a dwarf shrub with rose flowers in summer; and the fine variety of the latter called splendens. They are not particular as to soil, and are easily raised from seed in spring, when the perennials may be divided.

Onosma, Golden Drop (ō-nŏs-ma. Ord. Boragineæ). A small genus of charming hardy rock plants, the most graceful of which is tauricum, a variety of stellulatum; it grows about 1 ft. high, and produces its charming citron-coloured flowers in May. It thrives in limestone and sandy soils if put in positions where damp cannot lodge round the plants in winter. It may be propagated by seeds in spring. Helveticum is a white form of stellulatum. Other pretty Onosmas are albo-roseum, rose and white, which should be raised annually from cuttings; and echoides, pale yellow.

Onychium (ō-nÿch-ium. Ord. Filices). A small genus of ferns, the most popular of which is japonicum, a species which loses most of its fronds in winter, but is very graceful when in full growth. It thrives in a compost of peat, loam, and sand, with charcoal, and may be propagated by division. Very little water is needed in winter. Auratum, an evergreen, is also met with; it likes a hothouse.

Ophioglossum (ō-phiō-gloss-um. Ord. Filices). The native species vulgatum is the common Adder's Tongue. It is sometimes used for the rockery, and likes a compost of loam and peat, with partial shade. Propagation is by spores (see Ferns).

Ophrys (ō-phrÿs. Ord. Orchidaceæ). Interesting Orchids, mostly hardy. Apifera is the Bee Orchis, aranifera the Spider Orchis, bombilifera the Humble Bee Orchis, and muscifera the Fly Orchis. All may be grown in sandy or limestone soil in the rock garden, and may be propagated by division.

Opium Poppy. See Papaver somniferum.

Oplismenus. See Panicum.

Opuntia, Indian Fig, Prickly Pear. See Cactus (Opuntia).

Orange (Citrus Aurantium. Ord. Rutaceæ). The Orange is not cultivated for commercial purposes in the countries of Northern Europe, but it is often grown for ornament, as small plants in pots or tubs look very effective when full of fruit. For this purpose the Otaheite Orange is very suitable. It does not require much heat, in fact mere protection from frost in winter will suffice. It is thus suitable for cool greenhouses and conservatories. A compost of loam, leaf-mould, and sand suits it. The habit is naturally compact, so that very little pruning is needed, but the leaves should be sponged occasionally to keep the plant clean and healthy. If seedling Oranges are raised from pips they may be made into good fruiting plants by inarching fruiting branches of the Otaheite Orange. When repotting is necessary it should be done in spring. Six-inch pots suit bushes, and 8-in. suit standards.

Orange Ball Tree. See Buddleia globosa.

Orange Lily. See Lilium croceum.

Orchard. See Apples and Fruit.

Orchard-house. See Fruit.

Orchids. At no very remote period Orchids were regarded with something akin to awe by most amateurs, and were considered to be the monopoly of wealthy people who could afford to construct expensive houses and employ skilled specialists. The majority of amateurs never felt that they could indulge a homely love for Orchids as they could for Roses, Sweet Peas, and ferns. The plants were, in fact, aliens. That feeling has now become modified, and we begin to find amateurs of small means growing Orchids.

It must be admitted that the plants need special study, and that the majority require more heat and moisture than most other plants grown under glass. The reason of this is that they come from tropical countries, where the atmosphere is saturated and highly heated.

Cool-house Orchids. There are, however, certain Orchids which may be grown under cool conditions, and so far from these being species of no importance, they include Cypripedium insigne and its varieties and hybrids, which are among the most popular with the cognoscenti. Disa grandiflora is an Orchid that will thrive in a cool house, and another is the beautiful honey-scented Zygopetalum Mackayi, a graceful plant blooming in winter. The lovely Odontoglossum crispum, of which there are many exquisite forms, also thrives under cool conditions.

General Cultivation. The different kinds are grown in pots, pans, or baskets, and on blocks, according to their habit. The terrestrial kinds are grown in fibrous peat and Sphagnum moss, with a little charcoal, and the pots or pans are liberally drained with crocks; the epiphytes are grown in baskets with a little moss, or bound with wire on blocks and hung in a warm, moist house. The majority have a resting and a growing season; in the former they require very little water, in the latter a great deal. Most form what are called pseudo-bulbs, fleshy swellings between the collar and the leaf. In the state of nature these store moisture in the rainy season for use in the dry period.

Structure of Flowers. Orchid flowers differ from others in several important particulars. The stamens and pistil are combined in the column: there is only one anther, except in the Cypripediums, which have two; and the pollen is in masses, not in dust-like grains. The third inner segment, known as the labellum or lip, is generally the most prominent feature; in Cypripediums it forms a pouch; and the two lower sepals are merged into one. Orchid flowers last well when cut.

The principal Orchids are Cattleyas, Cypripediums, Dendrobiums, Odontoglossums, and Oncidiums. These and others are dealt with under their own names in this work.

Orchis (ōr-chis. Ord. Orchidaceæ). The hardy Orchids are an interesting class, and some are natives of Great Britain. The majority do well on a limestone soil, and chalk should be added to stiff land, where they are to be cultivated. Most enjoy cool, shady spots. Transplanting and division are best done in autumn, as they flower in spring. The following are a few of the best: foliosa, 2 to 3 ft. high, purple; latifolia, 1 ft., purplish-red, the Marsh Orchis—the Glasnevin variety of this is a handsome spotted form, there is also a white called alba; maculata, 1 ft., purple and white, there is a fine form of it called superba; militaris, 1½ ft., purple, the Soldier or Military Orchis; morio, 9 ins., purple, the green-winged Meadow Orchis; papilionacea, purple, the Butterfly Orchis; and purpurea, 1 to 2 ft., purple. See also Ophrys.

Oreocome Candollei (ōreo-cō-me. Ord. Umbelliferæ). A handsome plant with fern-like foliage, sometimes used for summer bedding. It is best kept in pots in winter in plain soil, to check its natural grossness. A good deal of water is required. Propagation is by seed. Selinum tenuifolium (Candollei) is the same plant.

Origanum (Marjoram). See Marjoram and Herbs.

Ornithogalum, Star of Bethlehem (ōr-nith-ŏg-alum. Ord. Liliaceæ). Best known through umbellatum, the pretty white "Star of Bethlehem," a fragrant flower often grown on the rockery or near the front of the border, hardy, and thriving in ordinary soil if the bulbs are planted in autumn 1 in. deep and 6 ins. apart; it likes a shady spot. Arabicum, on the other hand, prefers a warm, sunny spot; it is a beautiful and fragrant species, the white flowers having a central boss of shining black. It may be grown in pots for spring flowering, and as it is both pretty and sweet it is worth a place in the greenhouse. Lacteum, white with yellow anthers; and nutans, grey, are also popular.

Ornus (Flowering Ash). See Fraxinus.

Orobus, Bitter Vetch (ōr-ō-bus. Ord. Leguminosæ). One or two of these hardy herbaceous perennials are good enough for the garden, particularly vernus, purplish-blue, a spring bloomer growing about 1 ft. high. It is suitable for the rockery. There are several varieties of it, differing in colour. Pannonicus, with purple and white flowers in May, 1 ft. high, is also useful. They thrive in light loamy soil, and are propagated by seeds or division in spring.

Osmanthus (ŏs-măn-thus. Ord. Oleaceæ). Evergreen shrubs, of which ilicifolius, a variety of Aquifolium, is the best; there are several forms, differing in the shape and colour of the leaves, including one with variegated foliage. Fragrans (Olea fragrans) has white per-

fumed flowers, and not being quite hardy is sometimes grown in pots. Forrestii, cream, sweet; Delavayi, white, sweet; and armata, cream, sweet, an autumn bloomer, are good modern species. They like sandy loam, and may be propagated by cuttings inserted in sandy peat. Height 5 to 6 ft.

Osmosis. The equalisation of liquids of different densities, vital in plant-life. See a modern work on Botany.

Osmunda, Royal Fern (ŏs-mŭn-da. Ord. Filices). The Osmundas are among the most stately of ferns, and some are hardy. The clusters of sporangia near the tips of the fronds have earned for them the name Flowering Fern. Regalis is the finest of all, and this makes a noble companion for the Ostrich Fern in a cool, sheltered, humid spot at the waterside, where it may grow to a height of 7 or 8 ft. It is the handsomest of all the British ferns, and there are several forms of it, notably cristata, gracilis, and palustris. Bipinnata and cinnamomea are handsome Osmundas, but they are not hardy.

Osteomeles (os-te-ŏm-e-les. Ord. Rosaceæ). The only species grown is anthyllidifolia, a rare Chinese evergreen with twisted brownish branches, feathery foliage, and white flowers on long stems at the ends of the shoots, height 3 to 5 ft. It is an interesting plant, but not hardy, and therefore only to be grown outdoors under favourable conditions. Loam and peat, with sand, suit it. Propagation is by cuttings inserted in similar soil under a handlight in summer. Plant in autumn or spring.

Ostrich Fern. See Onoclea.

Ostrowskia magnifica (ŏs-trŏf-skia. Ord. Campanulaceæ). A beautiful Campanula-like hardy herbaceous perennial, growing 3 to 5 ft. high, and bearing large pale blue flowers in summer. It likes a sheltered but sunny spot, and a friable loamy soil with lime. A good deal of water is needed in dry weather. Propagation is by seeds in spring. It seeds freely where it makes itself at home.

Oswego Tea. See Monarda didyma.

Otaheite Orange. See Orange.

Othonnopsis (ō-thonn-ŏp-sis. Ord. Compositæ). The only species is cheirifolia (Othonna cheirifolia), a trailing sub-shrubby perennial with yellow flowers in early summer, height 18 ins. It is not hardy, but may be grown on a sunny, sheltered part of the rockery in light soil. Propagation is by division in spring or by cuttings inserted under a handlight in summer. Plant in autumn or spring.

Ourisia (o͞o-rĭs-ia. Ord. Scrophularineæ). A small genus of hardy herbaceous perennials, one species of which, coccinea, is a beautiful little plant, bearing its scarlet flowers in abundance in summer on stems about 1 ft. high. It loves moist, peaty soil in a shady place. Propagation is by seed and division in spring.

Ouvirandra, Lattice-leaf Plant (o͞o-vi-răn-dra. Ord. Naiadaceæ). A singular aquatic, whose lace-like, transparent green leaves are of great interest and no little beauty. It should be planted in loam and submerged in water that is kept lukewarm, and should be given a shady position in a warm house. The species is fenestralis, and modern botanists call it Aponogeton fenestralis.

Ovary. The part of a flower, lying below the pistil, which contains the unfertilised seeds, called ovules. In plants where it is formed within

or above the petals it is called a superior ovary; where behind or below, inferior. The ovary is considered to have developed mainly from the floral axis, but in some cases from carpels. See a modern work on Botany.

Ovules. Unfertilised seeds. Ovules are arranged in the ovaries in many interesting ways. See a modern work on Botany.

Oxalis, Wood Sorrel (ox-ā-lis. Ord. Geraniaceæ). A large genus, variable in duration, some being annuals and others perennials. The majority are low growers and ramble freely, so that they may be used for rockwork or hanging pans. The threefold character of the foliage of the species Acetosella has led to its being sold as Shamrock; the flowers are white, and are produced in spring; the plant will thrive in a cool, shady part of the rockery. Beyond this the most popular species are cernua, spring, greenhouse, yellow, good for hanging pans; corniculata rubra, yellow flowers and purple foliage, hardy; Deppei, red flowers in spring, greenhouse; floribunda, rose, greenhouse, spring, perhaps the most generally useful of all; Ortgiesii, yellow, greenhouse, summer; purpurata (Bowieana), purple, greenhouse, autumn; adenophylla, a Chilian species, crimson, 6 ins., bulbous, hardy; enneaphylla, white, sweet, 6 ins., bulbous, hardy; and rosea, rose, greenhouse, spring. The hardy kinds will thrive in ordinary soil. Those in pots or pans may have loam, lightened with leafmould and sand. Several are tuberous and form offsets, by which they may be propagated; the herbaceous sorts may be divided.

Ox-eye. See Adonis and Buphthalmum.

Ox-eye Daisy. See Chrysanthemum Leucanthemum.

Oxycoccus (ŏxy-cŏccus). The species palustris is the common Cranberry, which is rarely cultivated. Macrocarpus, with pink flowers in spring, followed by large fruits, is the American Cranberry. Both thrive in moist peaty soil. Plant in autumn or spring.

Oxydendron, Sorrel Tree (ŏxy-dĕn-dron. Ord. Ericaceæ). The species arboreum (Andromeda arborea) is a small deciduous tree with toothed leaves, and white flowers in early summer, height 15 to 30 ft., according to circumstances. Not the least of the attractions of this handsome tree is the rich colour of the leaves in autumn. It likes a moist peaty soil, and does best in a sheltered position. Plant in autumn.

Oxyura (ŏxy-ū-ra. Ord. Compositæ). The species chrysanthemoides is a yellow hardy annual, synonymous with Layia Calliglossa. Elegans is the same as Layia elegans. Sow outside in spring in ordinary garden soil.

Oyster Vegetable. See Salsify.

Ozothamnus (ōzō-thamnus. Ord. Compositæ). The only species of this small genus commonly met with is rosmarinifolius (Helichrysum rosmarinifolium), a shrub with Rosemary-like fragrant leaves and dense clusters of white flowers in summer, height 4 to 5 ft. It is not perfectly hardy, and should have a sheltered position if grown outdoors, preferably with loam and peat. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in autumn or spring.

P

Pachysandra (packy-săn-dra. Ord. Euphorbiaceæ). The species terminalis is a dwarf Japanese shrub with white flowers in spring, height 1 ft., suitable for a shady part of the rockery in sandy loam or peat. Plant in autumn or spring.

Paeony (pē-o-ny. Ord. Ranunculaceæ). The Paeony is one of several hardy perennials which have been developed by florists to such a degree that the hybrids and varieties have displaced the old species almost entirely. This remark applies both to the herbaceous and the shrubby types. Most of the modern herbaceous Paeonies have sprung from the white species albiflora and the red officinalis; while the modern shrubby Paeonies have sprung from the species Moutan, the Tree or Mountain Paeony. Another shrubby species in lutea is grown, for it is distinct both in foliage and in the clear yellow of its flowers. There is a fine yellow hybrid of it called La Lorraine.

Herbaceous Paeonies. These form the more important group and have indeed become one of the most valuable of all hardy herbaceous plants. In them we have luxuriant foliage and immense flowers of brilliant colour produced in late spring and early summer, before the Roses are out. The plants start early, and are ornamental almost from the first, because of the rich colour of the leaf-stems. Nor must perfume be forgotten.

Cultivation of Herbaceous. The chief points are: (1) deep rich soil, (2) adequate staking, (3) little disturbance. A shallow chalky or sandy soil, deficient in humus, does not do them justice. They appreciate, and deserve, a deeply-tilled, well-manured, substantial loamy or clayey soil. When in full growth and bloom in such a medium, they form broad spreading masses 3 to 6 ft. across, with flower-stems 2 ft. high or more, and call for support. The upper portions of Pea sticks, with the tips trimmed, may be set securely round each plant, and a stout cord run round all. With a little care neither leaves nor flowers are bunched. A few soakings of liquid manure will help the plants when they are coming into bloom. Infrequent disturbance is important. The fleshy, forked roots do not lend themselves to frequent division like, for example, Michaelmas Daisies, and yearly propagation by this means must not be practised. With liberal treatment they may be divided every four years. Nurserymen do not practise division for purposes of increase, but graft the stems on to the fleshy roots of the species named above.

Planting Herbaceous. The end of the winter, just when the underground buds are swelling, is a good time to plant Paeonies. A semi-shaded position is suitable, although they will grow in the sun.

Tree Paeonies. These should have a deep rich soil and a sheltered place, with removal of basal suckers when seen. The general treatment is similar to that for the herbaceous kinds. Propagation

is by cuttings taken with a heel in summer, inserted singly in small pots, and put under a handlight; also by grafting.

As with so many other popular plants in these days, new varieties of Paeonies appear every year. Readers should look out for them at the shows and in trade catalogues.

Pagoda Tree. See Sophora.

Paliurus, Christ's Thorn (pal-i-ūr-us. Ord. Rhamnaceæ). The species australis (aculeatus) is a prickly hardy deciduous shrub, with greenish-yellow flowers in early summer, common in Judaea and reputedly the plant of the Crown of Thorns. Ordinary soil. Propagation by root cuttings in sandy soil under a handlight late in summer; or by layers. Plant in autumn or spring.

Palm, Date. This is Phoenix dactylifera. See Palms for cultivation.

Palma Christi. See Ricinus communis (Castor-oil Plant).

Palms. These noble plants serve several useful purposes. As large specimens they are good for forming bold groups in conservatories and halls and on platforms; while as small plants they are good for rooms. They are distinguished by broad, generally deep green and often elegantly cut leaves. In most cases they are easy to grow, but all are not equally suitable for growing into large specimens, or for rooms. They are raised from seed, which are put in pots and plunged in bottom heat.

Compost. The majority will thrive in a compost of loam 3 parts, leafmould or decayed manure 1 part, and sand. Nice plants can be grown in 6-in. pots. They do not need frequent repotting, and it should only be done when the pots get crowded with roots; in this case act in spring. The pots should be well drained (see Drainage), as a good deal of water will be required in the growing season. Very little need be given in winter.

Room Palms. It is an aid to keeping room palms healthy to stand them outside when a soft shower is falling in summer. Otherwise the foliage should be sponged once a week with soft, lukewarm water. Weak liquid manure may be given once a week when the plants are well rooted. Soot-water, with ½ oz. of superphosphate per gallon, is excellent.

Useful Palms. Areca (Chrysalidocarpus) lutescens (r), Chamaerops humilis, Cocos Weddeliana, Geonoma gracilis (r), Kentia (Howea) Belmoreana (r), K. Forsteriana, Latania borbonica (Livistona chinensis) (r), Livistona australis (Corypha australis), Phoenix canariensis (r), P. reclinata, P. rupicola, and Trachycarpus excelsa (r) are all excellent. Those marked (r) are good for rooms. Cocos Weddeliana is a good table palm, and Chamaerops humilis is suitable for planting out in summer.

Enemies. Palm leaves sometimes become infested with a scale insect (Aspidiotus). Sponge with a 1 per cent solution of Volck, or other approved fungicide obtained from large seedsmen and florists.

Pampas Grass. See remarks under Gynerium.

Pan, (1) A shallow earthenware vessel in which to sow seeds (see Seeds and Sowing).

(2) The hard base a few inches below the surface of oft-ploughed land, and which must be broken to increase the fertility of the soil for gardening purposes.

Pancratium (păn-crā-tium. Ord. Amaryllideæ). The Pancratium is a

beautiful white greenhouse bulb, with long sepals. It thrives in a compost of 3 parts loam and 1 part leafmould, with sand; and may be grown singly in 5-in. or 6-in. pots. Most of the Pancratiums are agreeably scented. Calathina, maritimum, and fragrans, white, sweet, are perhaps the best-known species. The last may be grown out of doors in sandy, well-drained soil in a sunny place.

Pandanus, Screw Pine (pan-dā-nus. Ord. Pandaneæ). Handsome foliage evergreens, with pointed, strap-shaped leaves, some variegated. They are useful for introducing to conservatory groups on special occasions, and for table decoration. Loam, with a fourth of peat and some sand, suits them. They may be propagated by suckers in bottom heat in a hothouse. They like a light position, and only need shade from strong sun. The house should be vaporised or fumigated occasionally to keep down insects. The following are a few of the best: Baptistii, green and yellow; Sanderi, green and yellow; and Veitchii, green, banded with white.

Panicle. An inflorescence the branches of which are divided irregularly. The flower-stalk (peduncle) carries stalklets (pedicels) which themselves branch as in Oats.

Panicum (pan-i-cum. Ord. Gramineæ). Graceful Grasses, suitable for pot culture, and easy to grow. They thrive in loam, with a third of leafmould and some sand, and are easily propagated by division. The most popular species is variegatum, a graceful green and white trailer suitable for pot culture in the greenhouse; botanists now call it Oplismenus Burmannii. It must not be confused with P. virgatum, which is a hardy perennial with silvery leaves.

Pansy (Viola tricolor. Ord. Violaceæ). One of the greatest garden favourites, growing in most soils that are not very poor and dry, and easily propagated by seeds, by cuttings in autumn, and by slips from the base inserted 3 ins. apart in a cold frame in early autumn. If brown aphis is kept under, the last will flower the following spring. A dressing of cow manure improves the soil, and supplies of liquid manure will help the plants to continue growing and flowering. The named tufted Pansies, or hybrid Violas, are not, as a rule, available from seed, and are propagated by basal sucker-like cuttings like the other Pansies. These make beautiful lines and beds if planted in April in fertile soil and given liquid manure and mulching. They continue to flower best if the blossoms are picked frequently.

Exhibition Pansies. The Pansy is an exhibition flower of some importance in Scotland, where two classes, Show and Fancy, are grown, but the cult of the prize Pansy is not pursued avidly in England, because the exhibition varieties do not give of their best, even under special culture, suffering severely by comparison with Scotch flowers. The main reason is doubtless want of atmospheric humidity, which curtails activity of growth and thereby cripples the flowers. This is more particularly the case in the South and East of England. As a rule the early flowers are good, but after the heat of June has operated, the plants lose their freshness and the quality of the flowers deteriorates. To a certain extent this affects all Pansies, including the tufted Pansies or florists' Violas, but a reduction in the size of the flowers is not so serious a matter for the flower gardener as it is for the exhibition grower.

Tufted Pansies. Pansies which make abundance of tufts continue to bloom freely long after single-stem plants have become exhausted, and if the later flowers are smaller than the earlier, the culture is not necessarily a failure. Tuftiness is a habit of the modern Viola and it can be increased and maintained by liberal treatment, including top-dressings of soil and manure in July and August, with liquid manure if available. It is furthered by constant removal of old flowers. For this reason most Pansy lovers give attention to the Violas instead of to the Pansies proper.

Seedling Pansies. Beautiful Pansies can be grown from seed sown in summer, the plants put into the beds in autumn, flowered in spring, and cleared away to make room for Asters in July. Plants can also be flowered in summer from seed sown under glass in February of the same year, but this system of culture subjects them to the strain of doing their principal work in the hot and trying weather of summer and they do not give equal satisfaction to those raised the previous year and brought into bloom two months earlier. Nor does growing them in shade solve the problem, for they develop a straggly habit, bloom sparsely, and lose size. The Aster-Pansy combination removes all difficulties and gives us charming beds at small cost.

Types of Pansies. The amateur should not look for distinct varieties when growing Pansies from seed; he should be satisfied with a type. Take Madame Perret, for example. This is not a variety, but a class, the varieties of which have certain shades in common. At a distance the bed seems to be composed of one variety, but near inspection reveals that although the flowers bear a general resemblance to each other owing to a similarity in marking, they are not all identical. The grower can, if he think fit, reproduce any particular one by means of cuttings, but that tends to defeat the object in view by leading to specialisation and should only be resorted to in rare cases. Masterpiece, Trimardeau, Bugnot's Giant, Matchless, and other strains, including the special selections of the principal British seedsmen, give us similar cases to Madame Perret. Lord Beaconsfield, however, is a true variety, showing little if any variation, even from seed, and the two shades of blue blend very harmoniously. Mark Mills presents us with one of the exceptional cases in which vegetative reproduction is, if ever, pardonable, for it is a flower of the richest beauty, gloriously coloured with its body of pure, clean claret and its broad band of yellow, perfect of shape, large of bloom, and strong of stem. It makes a most beautiful bed with no associate, but as seen in combination with the slender, silvery-leaved Gnaphalium microphyllum it is even more beautiful. This Pansy is not easy to obtain. Unfortunately, seed does not seem to be available. When procured, and plants raised, the stock can be increased by cuttings in a cold frame in autumn. They can be true stem cuttings or partially rooted shoots pulled from the base.

Named Violas. True stocks of the named varieties must be propagated by cuttings if they are to be kept uniform in colour and habit, and this must be done at the end of summer, wintering the cuttings in boxes in frames or cool houses and putting the young plants out when they are comfortably rooted in spring. By such means are perpetuated numerous pretty named varieties which are used for bedding, carpeting Rose and other beds, and edgings. But if these

popular sorts cannot be grown true from seed, the resolute supporter of seminal propagation may find other varieties in blue, purple, white, and yellow which come with so little variation that they may almost be described as true. These will serve general garden purposes just as well as the named sorts. See also Viola.

Papaver, Poppy (pa-pā-ver. Ord. Papaveraceæ). Few garden flowers are more familiar than the brilliant if fleeting annual Poppies, but both the annual and the perennial kinds are esteemed. The Shirley Poppies, with their pretty shimmering flowers, are among the most charming of annuals; they originated from the Corn Poppy, P. Rhoeas. The double Paeony-flowered Poppies came from P. somniferum, the opium Poppy, a tall annual. These doubles are splendid plants, growing 2 to 3 ft. high, and bearing large, brilliant flowers which last better than the singles. The Iceland Poppy is P. nudicaule, a dwarf grower suitable for grouping in the rock garden; there are orange, yellow, and white forms; this plant is best treated as a biennial (see Biennials). The Sunbeam Poppies are improved Icelands. Orientale, of which bracteatum is a good form, is the giant oriental Poppy, a perennial with brilliant flowers, many named varieties of which are now offered. Umbrosum, scarlet with black spots, is a handsome Poppy; it may be grown either as an annual or a biennial. Alpinum, various colours, 9 ins.; pilosum, orange, 2½ ft.; and rupifragum, salmon, 1½ ft., are also good. The Poppies will thrive in almost any soil. Propagation is by seeds sown outdoors in spring and early summer, and, in the case of the perennials, by division and root cuttings also. The popular Shirleys make beautiful masses if sown outdoors and thinned progressively to about 9 ins. apart.

Paradisea. See Anthericum.

Paradise Stocks. See Apples and Fruit.

Paraffin. Paraffin oil, or petroleum, is useful to the gardener as an insecticide, especially when combined with soft soap to form an emulsion and well diluted with water. 1 lb. soft soap should be boiled in 1 gallon water, ½ pint paraffin stirred in while the solution is hot, and the whole churned up in a tub of water by means of a syringe. Add 9 gallons hot water slowly, and repeat the churning. Apply hot in the evening. Paraffin oil may be dabbed on to patches of American blight in a crude state with a small brush, but it should not be allowed to run on the bark.

Paris Daisy. See Chrysanthemum frutescens and Marguerite.

Paris Green. An arsenical compound, once much used by fruit-growers for spraying on to trees in spring for the purpose of poisoning caterpillars, but now discarded by many in favour of arsenate paste. If used, it should not be at a greater strength than 1 lb. to 200 gallons of water, and it must be kept well mixed, or it will destroy the foliage. Arsenate paste, 1 lb. to 25 gallons of water, is superior.

Parnassia (par-năss-ia. Ord. Saxifrageæ). The species palustris is a pretty British bog plant, with white flowers in summer. It may be used in bog gardens, in peaty soil. Caroliniana, white, 6 ins., also likes these conditions.

Parochetus, Shamrock Pea (păr-o-kē-tus. Ord. Leguminosæ). The species communis is a lovely blue trailer, flowering late in summer or in autumn; suitable for the rockery. Good loamy soil suits.

Propagation is by division in spring. It is not perfectly hardy, and should therefore have a sheltered position.

Parrot-beak Plant. See Clianthus.

Parrotia (parr-ô-tia. Ord. Hamamelideæ). The species persica is esteemed as much for the brilliant colour of its foliage in autumn as for its scarlet flowers in early spring; both are attractive. It is a semi-hardy deciduous tree growing 10–15 ft. high. Friable soil in a sheltered position, as for example on or near a wall, suits it. Propagation is by layers in autumn, or by cuttings under a handlight in spring. Plant in autumn or spring.

Parsley (Carum Petroselinum. Ord. Umbelliferæ). The housewife likes to have a row of Parsley in her garden from which to gather sprigs for garnishing her dishes, and there is no trouble in giving her what she wants every day in the year, provided frame-room can be found in winter; otherwise she may go short in spells of hard frost. Our seedsmen know well how greatly the feminine eye is pleased by beauty of form, and they have consequently given us varieties of Parsley that are beautifully curled. The seed of these may be sown in the open in March. The soil should be covered with decayed manure, and then dug deeply, turning the manure well in. 4 oz. of superphosphate of lime per square yard may also be dug in. The seed should be sown thinly, when 1 oz. will sow 200 ft., and covered with about ½ in. of soil. The seedlings may be thinned to a few inches apart, and then left to grow, with the result that there will soon be a splendid row. The seed germinates slowly, therefore patience should be exercised after sowing.

Parsnip (Peucedanum sativum. Ord. Umbelliferæ). If not one of the most popular of vegetables, the Parsnip is certainly one of the most nourishing, and is worthy of culture in all kitchen gardens. The seed is light and soon loses its vitality; it should therefore be sown as early in spring as the state of the soil will permit. Ground that was cropped with Peas the previous year, or that has been cleared of Celery, will generally give a good crop of Parsnips without further manuring, but it is a good plan to dress the ground with soot and lime, which may be spread on at the rate of ½ lb. each per square yard, and dug in immediately towards the close of winter.

Sowing. When the ground is dry enough to crumble in March or early April, draw drills 18 ins. apart and 1 in. deep, sprinkle the seed in thinly, 1 oz. sufficing for 150 ft., and cover. The plants may be thinned to 1 ft. apart. Growers for exhibition make deep holes with a spike or crowbar, fill with prepared friable loamy compost, sow 2 or 3 seeds in each, and thin the seedlings to one. The roots ought to be ready for pulling in October, but they improve in flavour as the autumn wears on, so that there should be no hurry in removing them from the ground, except in such quantities as are required for immediate needs.

Enemies. Parsnips are often attacked by a fungus disease on the root, called "rust." Liberal dressings of soot and lime, and the avoidance of fresh manure, will keep it in check. A leaf-mining maggot sometimes attacks the leaves, and it should be met by crushing the affected leaves immediately and spraying with a solution of soft soap in which a wineglassful of paraffin oil has been stirred. See Paraffin.

Varieties. Hollow Crown, Maltese, Student, Tender and True. The fourth of these is the best flavoured. See also seedsmen's specialities.

Parthenogenesis. The principle under which seeds capable of germinating are developed in the ovary without fertilisation.

Partridge Berry. See Gaultheria.

Pasque Flower. See Anemone Pulsatilla.

Passiflora, Passion Flower (păssi-flō-ra. Ord. Passifloræ). Beautiful and interesting climbers, of which the best known is caerulea, the Passion Flower; it bears its familiar purple, blue, and white flowers in summer. The fruit is yellow, and pleasantly perfumed when ripe. The white variety, Constance Elliott, is nearly as popular as the blue. These Passifloras are so nearly hardy that they may, if desired, be risked outdoors in mild districts and sheltered places, being used on walls, arches, and pergolas. Of the tender Passifloras, edulis, with purple and white flowers in summer, and edible fruit called Granadilla, likes a hothouse; incarnata, purple, green, and white, an herbaceous perennial that will thrive in the greenhouse; and quadrangularis, violet, red, and white flowers in autumn, followed by greenish edible fruits if the flowers are impregnated by hand, likes a hothouse, are the best known. They are better planted out than in pots, so long as the border is not made so large and rich as to encourage luxuriance, which is inimical to flowering.

Compost. Equal parts of loam and peat, with sand, suit.

Propagation. By cuttings of young shoots under a handlight in summer, or by seeds sown as soon as ripe in a frame or greenhouse.

Pruning. Thin the growths after flowering to prevent crowding. Avoid tying the shoots in stiffly.

Paths. See Walks.

Patrinia (pat-rīn-ia. Ord. Valerianaceæ). The rare Japanese biennial species palmata, with yellow flowers, height 9 ins., is worth a place on the rockery. Ordinary friable soil. Propagation by seeds if available. Plants may be purchased from specialist dealers in hardy plants.

Paulownia (paul-of-nia. Ord. Scrophularineæ). The species imperialis is a handsome deciduous tree from Japan, growing 3 to 4 ft. high, and with large leaves, which make it suitable for bedding out. It likes a loamy soil. Propagation is by cuttings of young shoots in summer, inserted in sandy soil under a handlight, or in a frame. In cold districts a sheltered place should be provided. Among modern species, Fargesii, Duclouxii, and imperialis alba, all with white flowers, have been introduced from China. Plant in spring.

Pavia. See Aesculus (Chestnut).

Pea, Everlasting. See Everlasting Pea and Lathyrus.

Pea, Green (Pisum sativum. Ord. Leguminosæ). The Green Pea is one of the oldest of vegetables, but it did not come into general cultivation in Great Britain until the seventeenth century, and very little progress was made in the improvement of varieties until the beginning of the nineteenth, when Knight raised the first wrinkled-seed marrowfat variety. The number of sorts which combine delicious flavour with abundant podding is now considerable, and the Pea-lover has a choice that is so wide as to be almost embarrassing. Some varieties pod early and some late, so that crops may be had over a long period. In early districts the first outdoor crop will be

ready in June, and in late ones the last may be in use in November. The best crops are generally secured in July and August.

Early Crops. Those who want an early crop and have no glass should choose a sheltered place with a south or south-west aspect, and sow as soon as the ground becomes crumbly after the end of February. It is a mistake to sow when the soil is sodden and pasty. A warm border under a south wall will sometimes yield early Peas in 13 weeks, but often 15 are required. Later in the year, when the soil is warmer, crops can be secured in 3 months or less.

Soil. The soil for Peas should be dug deeply or trenched (see Bastard-trenching and Digging), and manured liberally (see Manures, and Rotation-cropping under Vegetables). In the case of heavy soil the seed may be covered 2 ins. deep, and in light 3 ins. It is wise to make a wide drill and sprinkle the seed well over it, making a pint go at least 80 ft.

Enemies. The prospects of a row of Peas are easily discernible within a month from the sowing, except in the case of Peas which have been sown in autumn or winter, when the ground is cold. If at the end of a month spring-sown Peas are growing freely and are of good substance and colour, it may be assumed that they are safe up to the podding stage. Then, in a dry spell, they may be attacked by thrips, which cause the incipient pods to shrivel. The best remedy for this pest is nicotine solution, of which a wineglassful may be mixed in 3 gallons of water and syringed on. See Nicotine.

How weevils get into the pods of Peas is a puzzle to some people. They get in through the flowers and the only preventive is to apply something to the plant while it is in bloom which will act as a deterrent. The nicotine solution has the desired effect, but in the absence of thrips the same result can be secured by the simpler plan of dusting the plants with a mixture of soot and lime. Weevils, however, are rarely in evidence except when the pods have been allowed to grow old on the plants.

More dangerous to Peas than weevils is mildew. Would that we could say that good soil and good culture will always keep this fungus at a distance. In extremes either of wet or drought it is liable to appear in spite of the best of treatment. More especially is it liable to attack the plants during a spell of summer drought, perhaps when they are in their prime and yielding heavy crops of delicious Peas. A good soaking of liquid manure to the roots and an application to the foliage of a solution of liver of sulphur, 1 oz. per 3 gallons of water, form the best preventive.

There remains the question of the birds—that thorny question which so many try to solve by the barbarous method of the gun, and which so many others, blinded by the beautiful bird-love, refuse to admit is a problem at all. It is a problem, but the gun is not the proper solution, except on occasion under the infliction of a scourge of finches. Protective measures move in stages: for the seeds, a moistening with paraffin oil, or quassia water, or linseed oil with a supplementary dusting of red lead; for the seedling plants a canopy of black thread or scares, or tanned netting; for the pods the syringing mentioned above.

Staking. Sticks for supporting Peas should be 18 ins. longer than the nominal height of the Peas, and forced well down after having

the base sharpened, so that they grip securely. Hazel, Ash, and Larch all answer. Six should be allowed per yard, three on each side of the row. Stakes and cord may be used for supporting Peas up to 30 ins. high, but sticks are better. Wire netting attached to iron rods or strong poles makes a very fair substitute for sticks. When young Peas are nicely through they may be thinned if crowded and earthed up with a couple of inches of crumbly mould. Where several rows are sown on the same piece of ground it is customary to sow them the same distance apart that the plants grow high, and the ground between may be cropped with Spinach, Turnips, or Lettuces.

The pods should be gathered young, and pods of different ages and varieties should not be mixed in a dish.

Exhibition Peas. If very large pods are wanted for exhibition, the plants should be stopped 1 ft. short of their normal height and liquid manure applied. This, supporting bastard-trenching, manuring, and thinning, gives size.

When the crop is over, the plants should not be left on the ground to become a prey to mildew, but should be cut off just above the ground level and cleared away. The roots may be left in the ground, as they supply the soil with nitrates. Selections of varieties:

Dwarf Early
English Wonder
Pioneer

Four feet Early
Gradus

Medium Second Early
Senator

Three to four feet Late
Autocrat
Gladstone

Marrowfat Varieties of fine Flavour
Duke of Albany, 5–6 ft.
Peerless, 4 ,,

Large Exhibition Varieties
Alderman, 5–6 ft.
Duke of Albany, 5–6 ,,
Matchless Marrowfat, 5–6 ,,
Prizewinner, 3 ,,
Quite Content 5–6 ,,

See also seedsmen's specialities.

Pea, Sweet. See Sweet Peas.

PEACHES AND NECTARINES

The Peach (Prunus persica. Ord. Rosaceæ) differs from the Nectarine only in having a downy instead of a smooth skin; for cultural purposes the two fruits may be considered as one. They are the most juicy and luscious of all the larger fruits, with the possible exception of the Pear. They are not, however, so hardy as their relatives the Plum and the Cherry. Partly from this cause, and partly because they lend themselves so well to flat training, they are almost exclusively grown against walls, but in the comparatively few places where orchard-house cultivation is practised they are often included in the collection of pot trees and grown as open bushes. In the old days Peaches and Nectarines were generally grown outside, but they are now given glass in most places, if only in the form of what is technically known as a " case "—that is, a narrow corridor-like structure. It may be that with the greater prevalence of glass houses the modern school of gardeners does not fully learn the art of Peach culture in the open air; be that as it may, failures are common, and it becomes more and more the rule to grow this delicious fruit under cover.

Peaches and Nectarines—*continued.*

Outdoor Culture. It must not be assumed, however, that Peaches and Nectarines cannot be grown satisfactorily in the open air. Some gardeners are conspicuously successful with them, especially in the south of England. The most important matters are shelter, care in the early stages of training, and freedom from insects and fungi.

Enemies. The Peach is an early grower and bloomer, and its foliage is delicate. If exposed to cold spring winds the sap is checked, and a terrible disease called blister attacks the trees, which are seriously retarded, or even killed outright. The blister, which appears in the form of large swellings on the leaves, and causes them to shrivel and fall, is the work of a fungus called Exoascus deformans. Bordeaux Mixture (which see) is a good preventive, if sprayed on as soon as the leaves unfold, but it is desirable to avoid the attack if possible by providing shelter. Where possible the Peaches should be grown on the inner face of kitchen-garden walls. (Blister may appear on indoor Peaches if the ventilators are left open when a cold wind is blowing from a quarter which causes it to cut through them on to the trees.) Outdoor Peaches are sometimes crippled by black fly, which establishes itself in force on the young shoots and sucks out the life-giving sap. This pest must be kept under or the trees will be spoiled. It can be destroyed by syringing with quassia water (see Quassia), or with a solution of paraffin oil and water (see Paraffin), or with almost any of the proprietary washes offered by florists and seedsmen. Thrips may infest the leaves if syringing is neglected. Syringe 2 or 3 times at intervals with a selected insecticide. See Thrips. Mildew sometimes attacks the foliage; dust with green sulphur while the leaves are damp.

Soil. A mistake often made with outdoor (and sometimes indoor) Peaches is to plant them in rich, loose soil, and provide no restriction of the luxuriant growth that follows. The result is that the wood made in the summer runs 4 or 5 ft., and is as thick as a walking-cane; in 2 or 3 years the base of the wall is nearly bare, and the tree bears fruit only on the smaller wood on the upper part of the wall. Ordinary kitchen-garden soil is generally rich enough for Peaches, as they are naturally vigorous growers, and more often need curbing than accelerating. In any case, half a barrow-load of manure is likely to be enough for each tree. Wood ashes and lime rubble are suitable materials.

Pruning. It is wise to start with a 2 or 3-year-old tree and shorten the branches to one-third their length. The following year prune to half the length of the branches. This ensures the lower part of the wall being well furnished with wood. The growths then secured will form the skeleton of the tree, and should be fastened in quite clear of each other, so as to admit of young fruiting side shoots being laid in between them. There should be no crossing of shoots, and no shoot must be allowed to grow out from the face of the wall; all that spring from the front of the branches should be cut clean out.

Planting. May be done from November to March inclusive. It is an excellent plan to fix a wooden coping about 1 ft. wide just below the top of the wall above the trees. It serves as a protection, and in spring, when the trees are in bloom, light canvas (tiffany or

scrim), or even tanned fish-netting, may be fixed to it and allowed to hang down in front of the trees on frosty nights.

Peaches Under Glass: Training. Peaches and Nectarines are sometimes grown on walls under glass, and sometimes on wire frames fixed under the roof of a lean-to house. With a wide house against a high, strong wall both methods of training may be adopted. In each case a flat, fan-shaped tree is used. Little heat is required, unless early fruit is wanted, and a flow and return 4-in. pipe will suffice. For the roof, the trees will be planted near the front, that is, at the lowest part, of the house; and the branches will follow the rise of the roof a foot below, where wires will be strained for the shoots to be tied to. In the case of the back wall the trees will be planted against it, and the shoots attached to wires fastened to it, or secured by shreds and nails. The fan system will be adopted. Early pruning will be desirable, as in the case of outdoor trees, if they are bought quite young. It is easy to get older trees, already in an advanced stage of training, and ready to give fruit the first year, but the cost will be rather high. Unfortunately, some people spoil good trees by neglecting to train up new wood from the base when the older branches get bare there, yet the work is simple if taken in hand at the proper time.

Soil and Planting. If decayed turf is available no manure need be used, even should the natural soil be poor, for a barrow-load of good loam for each tree will contain all the nutriment which it requires. But half a bushel of wood ashes and a quart of broken bones may be mixed with the loam. In planting, the subsoil should be loosened, some of the decayed turf spread on it in a lumpy state, the tree set in position, the roots covered, and the top soil trodden well round them. Planting may be done up to the time the buds begin to swell.

Pruning. When the necessary amount of wood to form the framework of the tree has been secured by early shortening, the grower may proceed to fill in with fruiting wood. The best placed of the summer shoots should be chosen for this purpose. If the tree is healthy more will push than are needed, and a selection should be made among them, cutting away the front shoots first, and retaining such of the others as are well placed for tying in between the main branches without crowding. These young shoots may be neatly laid in when the leaf falls, and will bear fruit the following year. They will also push side shoots of their own, but these must be gradually pinched out while small, with the exception of one at the base and one near the top. The former may be allowed to extend unchecked, because it will provide a fruiting shoot for the following year; but the latter may be stopped at the second leaf.

Watering and Syringing. Peaches soon suffer from dryness, either at the root or in the atmosphere. If the air gets very parched, red spider may attack the trees. If the soil is kept moist throughout the growing season, and the house is syringed daily during sunny weather, there will be no trouble on this score.

Temperatures. Low temperatures should be the rule to start with; 45° (night) to 55° (day) will do at first; when the fruit has stoned and is swelling, another 10° may be given. The sun will aid more and more as the spring advances, and as it gains power the ventilation must be increased. If early spring forcing is to be carried on,

Peaches and Nectarines—*continued.*

6 months must be allowed from starting to gathering the crop: thus, to have fruit in June a start must be made towards the end of December.

Propagation. Peaches are largely budded on the St. Julien stock, but the work is almost exclusively carried on in nurseries. Seedling stocks raised from stones can be budded in summer or grafted in spring like other fruits (see Apples).

Varieties. Selections may be made according as early, midseason, and late varieties are wanted. The following are good in their classes; (p) indicates a Peach and (n) a Nectarine:

Early

Cardinal (n)
Early Rivers (n)
Hale's Early (p)

Midseason	*Late*
Early Grosse Mignonne (p)	Barrington (p)
Dymond (p)	Walburton Admirable (p)
Lord Napier (n)	Sea Eagle (p)

The following are suitable for outdoor culture: Hale's Early, Dymond, Sea Eagle, and Salwey.

Peacock Iris. See Iris Pavonia.

Pear (Pyrus communis. Ord. Rosaceæ). A delicious fruit, well suited, according to variety, either for dessert or stewing, and admirable for bottling or canning. Pears are excellent as neat pyramids at the side of walks, and may be grown successfully as fans and cordons on walls. Fruit-lovers often grow a collection of choice dessert Pears as cordons in preference to a small number of pyramids, in order to get the benefit of a succession of fruit, which can be obtained easily by making a suitable choice of varieties.

Soil and Site. The remarks made under Apples apply to Pears. They are at their best on a strong loam.

Stocks. The best stock for garden Pears is the Angers Quince, but amateurs will be well advised to leave propagation to the trade experts, because many varieties have to be "double-worked," that is, budded on another variety which is itself budded on the Quince. Bergamotte Esperen, Beurré d'Amanlis, Conference, and Olivier de Serres are Pears of double value, because they are not only worth growing for their fruit, but are also valuable as foster-mothers for more delicate Pears that do not take kindly to the Quince stock directly, but do so when one of the foregoing varieties intervenes. Knight's Monarch, Marie Benoist, Marie Louise, Passe Crasanne, Thompson's, and Souvenir du Congrès may be indicated as delicious Pears that only develop their best quality when double-worked.

Planting. The remarks made under Apples apply.

The Lorette System of Pruning. Speaking generally, the system of pruning described under Apples applies to Pears, but the modern system, developed with great success by M. Louis Lorette at Wagnonville, near Douai, is particularly suitable for amateurs. It may be described as a method of forcing trained trees to produce fruit-buds, by means of intensive summer pruning. The fact that all Lorette pruning is carried out in spring and summer has obvious attractions.

The following brief notes may serve to indicate the general principles of the system so far as processes are concerned; it is impossible to discuss the theory in the space available. For additional details, as well as for M. Lorette's interesting methods of training and general cultivation, readers must be referred to his book, *The Lorette System of Pruning*, which is obtainable in English.

There are two main processes—a pruning of the leading or extension shoots in April or May, when growth is at its height, and a hard pruning of all other new wood as it becomes partly ripe, in June, July, August, or later. Regarding Fig. 1 on page 495 as the end of a typical branch of a trained tree at about the end of April (*a* being the extension growth or " leader," and *b* and *c* incipient laterals), the method is to remove at this time only a portion of the leader—say one-quarter or one-fifth if the tree is a vigorous grower, but rather more (say one-third or one-half) if the tree is not vigorous, pruning to a convenient bud as shown at *d*. In June or early July, when the leader has grown on again and the laterals are half woody, the same part of the tree might be expected to look somewhat like *a'*, Fig. 2. At this stage the upper part is not touched, but is retained as the new leader, whilst the laterals *b*, *c* are pruned hard back, so that only $\frac{1}{4}$ in. or $\frac{3}{8}$ in. of them is left, including, if possible, a small leaf or two (*e*, *e*). It is important not to do this until the wood is ripe enough (half woody) and of pencil thickness or thereabouts; earlier pruning is harmful; if a shoot is not ready, it should be left until later. Growths develop around the little stump and later become embryo fruit-buds, actual fruit-buds, or wood shoots. Assuming that there are wood shoots, starting from stipulary eyes, these form the subject of the later pruning, being cut hard back in their turn as they become half woody and, say, 10 ins. or 12 ins. long, and as thick as pencils. By pruning in this way sap is directed strongly to the nourishment of buds, and, instead of the long fruiting laterals borne by trees pruned on the usual system, knobby spurs are built up at short intervals along each stem.

The term " stipulary eyes " has a very important meaning in the Lorette system. Stipules are leafy formations, not fully developed leaves, and their eyes, or buds, are weaker than the eyes or buds in the axils of normal leaves, and which produce what are commonly called " shoots." If ordinary shoots, which had developed from leaf-buds, were shortened in June while strong and soft, more strong soft shoots would start from the portion left; but Lorette's contention is that if side shoots are cut back below the basal leaf-buds, after the lower part has become woody, stipulary eyes (perhaps invisible) will start, and that the resultant shoots will be far less vigorous, and far more likely to develop fruiting wood, than the ordinary leaf-bud shoots.

For example, supposing Fig. 3 to represent a lateral after the June pruning, cut back when woody to a point below the leaf-buds, stipulary eyes about the points *f*, *f* will start. By about the end of July the resulting shoots will resemble *h*, *h* in Fig. 4. There are likely to be also two stubs, *g*, *g*, which will probably develop into fruit-buds. The shoots *h*, *h* are pruned at the bars *i*, *i* as soon as they ripen, and any similar shoots which may appear later are treated similarly. Thus a sort of knob or spur is gradually formed, which

extends irregularly, and which acquires further fruit-buds year by year until after a few years it may look like Fig. 5. with fruit-buds as at *k*, *k*, *k*. Various minor operations are recommended by M. Lorette, such as making incisions in branches (to retard or accelerate the growth of laterals, to encourage new shoots from which to develop new branches, and generally to aid in building up well-balanced trees), but these and other refinements cannot be dealt with here. The system is a heavy tax on the constitution of the trees, but it is effective, and there seems no doubt that the strain consequent upon the very heavy crops which follow can be counter-balanced by adequate feeding. Pears and Apples are M. Lorette's favourite subjects, but his method may be successfully applied to Plums and Cherries.

Insects and Diseases. The remarks under Apples apply, but a word may be said as to scale, which often fastens on the bark in large quantities. The following special spray may be used in winter: 1 gallon paraffin oil, 5 lb. soft soap, 25 gallons water. Slug-worm, a blackish-green slimy creature, sometimes attacks the foliage. The best remedy is the arsenate of lead spray, 1 lb. to 25 gallons of water.

Varieties. There is an enormous number of varieties, from which the following may be selected: (1) Jargonelle, (2) Williams's Bon Chrêtien, (3) Dr. Jules Guyot, (4) Hessle, (5) Souvenir du Congrès, (6) Fondante de Thirriott, (7) Beurré Hardy, (8) Emile d'Heyst, (9) Conference, (10) Louise Bonne of Jersey, (11) Magnate, (12) Marguerite Marillat, (13) Fondante d'Automne, (14) Beurré Clairgeau, (15) Knight's Monarch, (16) Beurré Diel, (17) Beurré Rance, (18) Beurré d'Amanlis, (19) Doyenné du Comice, (20) Marie Louise, (21) Pitmaston Duchess, (22) Thompson's, (23) Passe Crasanne, (24) Beurré Superfin, (25) Bergamotte Esperen, (26) Josephine de Malines, (27) Winter Nelis, (28) Glou Morçeau, (29) Easter Beurré. The list begins with earlies and ends with lates. Nos. 2, 3, 5, 7, 8, 9, 10, 19, 20, 24, 27, and 28 would make a good selection of twelve. Those who make a point of flavour should procure Nos. 7, 12, 13, 17, 19, 20, 22, 24, and 26. Two fine stewing Pears are Catillac and Uvedale's St. Germains.

Pearl Bush. See Exochorda and Olearia.

Pearl Everlasting. See Antennaria margaritacea.

Peat. Compressed and undecomposed vegetable matter. There are low-land and upland peats; the former are used for fuel, the latter, which is sandy, for potting composts and for Azaleas, Rhododendrons, and other peat-loving plants. Peats are formed through dead plants becoming saturated with acids and thereby preserved from decomposition. They are wanting in nitrates. Brown fibrous peat is preferred for Orchids. The different kinds of peat can be bought at nurseries and from dealers in horticultural sundries.

Pedicel, Peduncle. See Panicle.

Pelargonium, Stork's-bill (pĕl-ar-gō-nium. Ord. Geraniaceæ). A large and important genus, which includes the popular Zonal Geranium (*see* Geranium, Zonal). The plants generally grown under the name Pelargonium have plain green leaves, somewhat cupped and fringed, but not zoned or variegated. They are free-blooming, and the colours are brilliant, so they are well worth growing. Like

the Zonal they were more important in past years than they are now, and when florists grew them for exhibition they made various classes, such as Show, Regal, and Fancy, according to the type of flower. The plants are kept exclusively for pot culture. They are grown in warm greenhouses, and sometimes put in room windows when in bloom.

Compost. Loam, with a fourth of decayed manure and some sand, suits them.

Propagation. They may be propagated by cuttings of the prunings, inserted in sandy soil in a frame. After flowering they are stood in a sunny place outdoors, and water is withheld, thus bringing growth to a standstill. After a brief rest the branches are pruned back to short stumps, the plants are watered, syringed, replaced in the greenhouse, and started into fresh growth. Plants in 6-in. or 7-in. pots may grow nearly a yard through. Very little water is needed in winter, when they should have a light place in a greenhouse. Staking and tying will be needed, as each branch must be clear of its neighbour.

Scented Cape Pelargoniums. These are an interesting class. Some have handsome foliage, others have scented leaves. They are less grown now than they used to be, but one meets with them occasionally. The majority are evergreen shrubs, but a few are herbaceous; all need a greenhouse. Capitatum, rose flowers in June, has Rose-scented leaves. Citriodorum, white, summer, is Citron-scented. Fragrans, white, veined red, summer, has a smell of nutmeg. Radula, purple, June, is Balsam-scented. Tomentosum, white, summer, smells of peppermint. Quercifolium is interesting as having Oak-shaped leaves, and Inquinans and Zonale are still more so, as being parents of the popular Zonal Geranium. Endlicherianum differs from the majority in being herbaceous. All may be grown in a large, cool, airy greenhouse or conservatory, and need little water in winter. Loam, with a third of leafmould, and sand, suits. Propagation is by seeds in spring or cuttings in autumn.

Ivy-leaved Pelargoniums are popular, both for garden and pot culture. They make beautiful beds, and are also suitable for hanging baskets and pillar vases on balconies and at the side of steps. Propagation and soil are the same as for Zonal Geraniums (see Geranium). Achievement, Beauty of Castle Hill, Jeanne d'Arc, Madame Crousse, Queen of Roses, Ryecroft Surprise, Galilee, and Souvenir de Charles Turner are good double varieties. Galilee is one of the best bedders. But new varieties appear frequently, and should be looked out for at the shows.

Pelican Flower. See Aristolochia gigas.

Pennyroyal (Mentha Pulegium. Ord. Labiatæ). A herb used for flavouring and making a "tea." Roots may be obtained and planted in ordinary soil in spring.

Pentas (pen-tăs. Ord. Rubiaceæ). A small genus of hothouse shrubs, of which only one species is grown to any extent, and that is carnea, a sub-shrub growing about 18 ins. high, with pale pink flowers in autumn and winter; kermesina and Quartiniana are varieties of it. Loam, with sand and a third of leafmould, suits. Propagation is by cuttings of young shoots in a propagating case.

Pentstemon (pent-stē-mon. Ord. Scrophularineæ). A splendid genus

of hardy herbaceous perennials, sometimes sub-shrubby, as they may hold their stems through the winter. The dwarf species are charming for the rockery, while the taller, larger, florists' varieties are magnificent bed or border plants. Beautiful beds may be had by setting the plants 2 ft. apart; or groups may be formed in the borders. They bear large, bell-shaped flowers on long, arching stems. There are few soils in which they will not thrive, given a fair amount of moisture; while they are easily propagated by seed or cuttings.

Propagation. If seed is sown in a warm house in winter, the plants hardened in a cold frame in spring, and planted out in early summer, they flower well the same year. Cuttings of the best varieties may be taken in autumn, and put in sandy soil in a cold frame; should the plants be too full of bloom to form suitable growths for cuttings, the flower-stems may be removed in late summer and the plants top-dressed to encourage fresh shoots from the base. There are now many varieties, and fresh appear every year; notes should be made at shows and from florists' lists.

Species for the Rockery: Azureus, 1 ft., blue; barbatus (Chelone barbatus), 3 ft., scarlet, Torreyi and Salmoneus are varieties; glaber, 1 ft., blue; Hartwegii, 1½ ft., scarlet; gentianoides, 3 ft., violet; and Menziesii, 6 ins., purple and red, of which Scouleri is a mauve variety. Azureus, Hartwegii, and gentianoides are not quite so hardy as barbatus, glaber, and Menziesii. Newbury Gem is a good small scarlet Pentstemon, being very free in bloom and brilliant in colour.

Perennial. A perennial is a plant that lives more than two years (cf. Annual and Biennial). When flower-gardeners speak of perennials they have herbaceous perennials in mind, but, strictly speaking, trees and shrubs are also perennials. The principal perennials are dealt with under their names in alphabetical order throughout the book. See also Herbaceous Plants.

Pereskia. See Cactus (Pereskia).

Pergola. A pergola may be described as a series of connected arches. See remarks under Flower Gardens.

Perianth. Certain plants, such as Daffodils, produce flowers in which the calyx (see Calyx) and corolla (see Corolla) are indistinguishable. The two parts constitute a perianth.

Perilla (per-ĭll-a. Ord. Labiatæ). Half-hardy annuals, of which nankinensis is grown in flower gardens for its purple foliage. For culture, see Annuals, Half-hardy.

Periploca (pe-rīp-lo-ca, popularly perry-plō-ca. Ord. Asclepiadeæ). One species only is grown to any extent, and that is graeca, a quick-growing climber with peculiar greenish-purple flowers, suitable for pergolas and arbours. It is hardy, and blooms in summer. It is not particular as to soil. Propagation is by cuttings under a hand-light, or by layers, in autumn.

Peristeria, Dove Orchid (pĕr-i-stē-ri-a. Ord. Orchidaceæ). A small genus of Orchids, liking a light hothouse. Elata, the Dove Orchid, with its interesting and fragrant white, purple-spotted flowers in summer, is the best known. It forms large pseudo-bulbs. It should be grown in a mixture of fibrous loam, peat, and leafmould in equal parts, with sand, and may be propagated by division. A good deal

of water is needed while the plants are in growth, but little when they are at rest.

Peristrophe (pĕ-rīs-troph-ĕ. Ord. Acanthaceæ). Speciosa (Justicia speciosa) is a pretty winter-blooming plant, well worth growing by all who have a warm greenhouse. It grows about 2 ft. high, and bears its purplish-red flowers freely. Loam, with sand and a third each of leafmould and decayed manure, suits. Propagation is by cuttings inserted in a warm case in spring.

Periwinkle. See Vinca.

Pernettya (per-nĕttya. Ord. Ericaceæ). Pretty evergreens, hardy except in very cold, exposed places, but of slow growth and quite suitable for pot culture. The most popular species is mucronata (Arbutus mucronata), the charm of which lies in the pretty berries which follow the flowers; there are many varieties, and the colours of the berries differ, being white, flesh, pink, red, or purple. They thrive in equal parts of peat and loam. Propagation is by seeds in spring or layers in autumn. Little pruning is required as the habit is naturally close. Plant in spring.

Perowskia (per-ōf-skia. Ord. Labiatæ). The sub-shrubby deciduous hardy perennial species atriplicifolia, with violet flowers in long spikes in autumn, height 3 ft., may be mentioned. It thrives in ordinary soil. Propagation is by cuttings inserted in sandy soil under a handlight in summer.

Persimmon, Diospyros (dī-os-pȳ-ros. Ord. Ebenaceæ). The Persimmon is the yellow Plum-like fruit of Diospyros Virginiana, a deciduous tree growing up to 20 ft. high, with pointed shining leaves and small pale yellow flowers in summer. It should be grown on a wall in cold districts. Friable loamy soil suits it. Propagation is by cuttings inserted in sandy soil in summer, with bottom heat. D. Kaki is the Japanese Date Plum, which has attractive orange fruit. It should have a warm wall. Plant in spring.

Peruvian Lily. See Alstrœmeria.

Petals. The segments of a corolla, generally coloured.

Petasites (pet-a-sī-tēs. Ord. Compositæ). Hardy herbaceous plants, the most popular of which are fragans, the winter Heliotrope, a plant growing about 6 ins. high, with white flowers in late winter; and officinalis, the Butter Bur, 3 to 4 ft., with white flowers in spring. The latter makes a fine plant for the waterside, where its leaves attain to large proportions. Albus, white, 1 ft.; and palmatus, white, 6 ins., are less known. They will grow in almost any moist soil, and may be propagated by division.

Petunia (pe-tū-nia. Ord. Solanaceæ). Brilliant plants, with a profusion of large flowers. They are great favourites for bedding, and the double fringed forms are charming for pots. The garden varieties will thrive in almost any soil, and heavy manuring is to be deprecated, as tending to over-luxuriance.

Propagation. By seeds, which may be sown in a warm frame or greenhouse in spring, and the plants which are to go outside hardened in a cold frame. Those for pots should be pinched to make them bushy. Special varieties may be propagated by cuttings in autumn in a warm house.

Compost. Loam, with sand and a third of leafmould, will suit them. For beds, plant 2 ft. apart, and peg the shoots down.

Species and Varieties. The old species are rarely grown now, seedsmen offering mixtures, both single and double. There are, however, good self, or nearly self, Petunias, notably the charming old carmine variety Countess of Ellesmere, than which there are few prettier flowers, and the plants flower profusely for several months. These are suitable for beds and can be grown with ease and economy on the lines of other half-hardy annuals, such as Asters and Stocks. Petunias are particularly worthy of attention by those who are compelled to garden on poor soil.

Peucedanum (pew-ced-an-um. Ord. Umbelliferæ). Sativum is the Parsnip, which see.

Phacelia (pha-cē-lia. Ord. Hydrophyllaceæ). An unimportant genus, save for the species campanularia, which is a charming blue hardy Californian annual, growing about 9 ins. high, and of compact habit. P. viscida is synonymous with Eutoca viscida and has blue flowers. P. campanularia should be sown outside in spring where it is to flower and thinned to 9 ins. apart. Ordinary soil.

Phaenocoma (phāe-nō-cō-ma. Ord. Compositæ). The only species, prolifera, is a handsome greenhouse plant which can be grown into specimens 3 or 4 ft. through, and these when in full bloom are very effective. It is synonymous with Helichrysum proliferum. The variety Barnesii is generally preferred to the type, as the habit is better; the flowers are deep crimson. Sandy peat is the best soil. Propagation is by cuttings of firm side shoots inserted in a propagating case in summer. Repotting should be done when growth starts in spring. They like cool, airy conditions, under which the flowers last for many weeks.

Phaio-calanthe. These Orchids are bigeneric, having been obtained by crossing the two genera Phaius and Calanthe. They may be grown in the same way as Phaius (see below).

Phaius (phāī-us. Ord. Orchidaceæ). A small genus of tropical Orchids, with large, pleated leaves. They differ a good deal in character, some being evergreen and others deciduous. The former need a moist hothouse. The terrestrial species should be grown in fibrous peat and loam in equal parts, sand and a quarter of dried cow manure being added. Humblotii and its white variety alba will thrive in Sphagnum moss to which a little fibrous peat has been added. They may be propagated by division after flowering. They should not be dried off in winter.

Thunia Section. The Orchids once called Thunias by botanists, and which are deciduous, are now classed with Phaius. These have large flowers, and are very showy. They like a hothouse. They should be potted high in a compost of fibrous peat and loam, equal parts, with sand and a quarter of decayed cow manure. They may be repotted when they start growing in winter, and may be increased by division at that period if required. A good deal of water will be required in summer, but none in winter, when the plants are at rest. Alba Bensonae and Marshalliae are the most popular of the Thunia species, but there are several hybrids, of which superba and Veitchiana are good.

Phaius Section. Grandifolius, Humblotii, maculatus, tuberculosus, and Wallichii are the most popular of the Phaius species, but there are many modern hybrids. For details, see a modern work on Orchids.

Phalaenopsis, Moth Orchid (phăl-ae-nŏp-sis. Ord. Orchidaceæ). Beautiful Orchids, with flowers in long, graceful spikes. They require to be grown in teak baskets on the roof of a warm house. Nothing but crocks and Sphagnum are required, sufficient of the former being first placed in the baskets to raise the crown of the plants above the top; they may be packed in with Sphagnum; basketing should be done when growth starts at the close of winter. From then till early autumn a temperature of 70° to 80° should be maintained. During winter 60° to 70° will suffice. The atmosphere should be kept in a saturated state. A great deal of water will be needed in summer, but not in winter, when it will suffice to give no more than will keep the moss alive and fresh. Shade from hot sun will be necessary in spring and summer.

Select Species. Lowii, summer, purple, white, and yellow; Lueddemanniana, purple and white; Sanderiana, pink and white, winter; and Schilleriana, purple, rose, white, and yellow, spring, are the best. There are many varieties and hybrids, for particulars of which, see a modern work on Orchids.

Phanerogams. Flowering plants with visible organs. See also Cryptogams.

Phaseolus, Kidney Bean (phas-e-ō-lus. Ord. Leguminosæ). See Beans.

Pheasant's Eye. See Narcissus Poeticus; also Adonis.

Philadelphus, Mock Orange (phĭl-a-dĕl-phus. Ord. Saxifrageæ). Beautiful deciduous hardy shrubs, with large white flowers, fragrant in many species. They are not particular as to soil. Propagation is by layers in autumn, by suckers, or by cuttings of young wood in a frame in spring. They are excellent subjects for shrubberies. Old wood should be removed after flowering, and new retained for flowering the following year. Of the species, coronarius, Gordonianus, and grandiflorus (latifolius, floribundus, and speciosus) are the best. There are several varieties of coronarius, including a double and two with variegated leaves. Lemoinei is a fine garden hybrid. New hybrids and varieties appear from time to time at the shows, and there are now many beautiful sorts from which to choose.

Philageria (phĭl-a-gē-ria. Ord. Liliaceæ). A small hybrid genus, the only member being Veitchii, the result of a cross between Lapageria rosea (see Lapageria) and Philesia buxifolia (see below). It is an interesting bigeneric hybrid, with rosy flowers in June. Peaty soil. Propagation is by cuttings in a greenhouse or frame.

Philesia (phī-lē-sia. Ord. Liliaceæ). The one species, buxifolia, is a handsome shrub 1 ft. high, with red flowers in early summer, not quite hardy, and requiring shelter in cold districts. It likes peaty soil, and may be increased by suckers in spring.

Phillyrea, Box Jasmine (phĭl-ĭr-ia. Ord. Oleaceæ). Handsome evergreen shrubs, not particular as to soil, and easily propagated by cuttings under a handlight in sandy soil. The best species are angustifolia, decora, and latifolia, all with white flowers in May; there are several varieties of the last. Rosmarinifolia, a low evergreen, is suitable for the rockery.

Phlomis, Jerusalem Sage (phlō-mis. Ord. Labiatæ). Herbaceous and shrubby plants. Alpina, purple, 9 ins., summer, is suitable for the rockery. Fruticosa, however, a hardy evergreen shrub with

oblong leaves woolly on the underside, the so-called Jerusalem Sage, is the best known. It bears whorls of yellow flowers in early summer, height 2–3 ft. Ordinary soil. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in autumn or spring.

Phlox (phlŏx. Ord. Polemoniaceæ). Magnificent garden plants, some annual, others perennial. The former are nominally only half hardy, but they may be sown out of doors after mid-April; they are generally grown as half-hardy annuals, being sown in boxes in winter, pricked out 3 ins. apart in other boxes, and planted out in May. The perennials are hardy, and will thrive in any fertile soil; they enjoy moisture, but not stiff, heavy, wet soil. Propagation is by division when growth starts, by cuttings in summer, shaded from hot sun, and by seeds in early summer. The taller kinds, varieties of maculata and suffruticosa, make beautiful beds and border groups. The creeping kinds are good for the rockery.

Select Species. The following are a few good Phloxes: amoena, pink, early summer, 6 ins.; divaricata (canadensis), blue, spring, 1 ft., Laphami is a fine lavender variety; we have seen a charming spring bed composed of Phlox divaricata in a groundwork of white grape Hyacinths; Drummondii, annual, many varieties, good mixtures are sold by seedsmen; maculata (decussata), one of the parents of our perennial garden Phloxes, purple, early summer, 2 ft.; ovata, red, spring, 18 ins.; paniculata (acuminata, corymbosa), another parent of our modern Phloxes, purple, late summer, 3 to 4 ft.; reptans, purple, spring, creeping; and subulata (setacea), purple, spring, 6 ins., many varieties. Glaberrima, red, summer, 2 ft., and its variety suffruticosa, 1 to 2 ft., rose, early summer, have also probably been used as parents, in this case of the early summer Phloxes, which are dwarfer than the later flowering maculata-paniculata section.

All types of Phlox have advanced in favour during recent years, the dwarf annuals of the Drummondii class equally with the tall border perennials and the low perennials suitable for the rockery.

Annual Phloxes. Phlox Drummondii itself is an American plant with purple flowers introduced in 1835. It has been completely eclipsed by the garden forms and is rarely seen. There are, broadly, three types: the grandiflora or large-flowered, the nana compacta or dwarf, and the cuspidata or point-petalled. As a matter of fact, there is not a great deal of difference in the height of the grandiflora and nana compacta types, and the former should have preference. A bed of mixed seedlings is exceedingly pretty, and in view of the simplicity of culture and the long period during which the plants are in bloom, it is not surprising that the plants enjoy great favour. When they are first put out they must be protected from slugs by frequent dustings of fine lime, or with drenchings of lime water at night, or they will speedily disappear. A long list of distinct colours is found in the catalogues and the flowers come true.

Perennial Border Phloxes. The tall named perennials used for the herbaceous border do not come true from seed, but scarlet, blue, pink, and white shades are available in separate packets, and from these useful stocks of plants can be raised for the mixed border. Plants of the named varieties must be bought. New sorts come out

every year, and should be looked for at the shows and in the catalogues of florists. These are grand border plants, thriving in most soils, bearing beautiful clusters of brilliant and pleasantly scented flowers in summer which last well, thriving in any good garden soil, and easily propagated by division between November and mid-April inclusive.

Rock Phloxes. Seed of the dwarf perennials suitable for the rock garden may not be available, in which case plants will be bought. Divaricata and its large lavender-coloured variety Laphami, reptans, frondosa, amoena rosea, and such forms of setacea (subulata) as annulata, Lindleyana, The Bride, Vivid, and Newry Seedling, are a few of the most desirable of these gems, so beautiful in spring.

Phoenix, Date Palm (phō̄e-nix. Ord. Palmæ). Canariensis, dactylifera (Date Palm), reclinata, and rupicola are the principal species. For culture see Palms.

Phormium, New Zealand Flax (phōr-mium. Ord. Liliaceæ). Handsome plants, with long, slender green leaves, and beautiful panicles of bloom. They are not hardy everywhere, and should have sheltered places in cold districts. Loamy, friable, well-drained soil is desirable. Propagation is by seed or division in spring. Cookianum (Colensoi), green and yellow; and tenax, are the two species grown. There are several varieties of the latter; atropurpureum, with purple leaves, and variegatum, variegated, may be named.

Phosphatic Manure. See Manures.

Photinia japonica. See Eriobotrya.

Photosynthesis. The taking in by plants of carbon dioxide from the atmosphere and its disintegration into carbon and oxygen.

Phygelius, Cape Figwort (phȳ-jē-lius. Ord. Scrophularineæ). The species capensis is an evergreen shrub with toothed leaves and scarlet tubular flowers in summer, height 2–3 ft. It should have a sheltered place in cold districts, with friable loamy soil. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in spring.

Phyllocactus. See Cactus.

Phyllodoce. See Bryanthus.

Phyllostachys (phȳll-o-stăch-ys. Ord. Gramineæ). One of the three great genera of Bamboos, the others being Arundinaria and Bambusa, which see. Aurea, Henonis, mitis, nigra, and viridi-glaucescens are the most important species.

Physalis, Winter Cherry (phȳ-sā-lis. Ord. Solanaceæ). This genus is useful mainly owing to the showy species Alkekengi and Franchettii. In both the coloured bladder-like calyx ("fruit") gives the plant its beauty. The latter is much the better of the two, and the old Winter Cherry is dropping out in its favour. They are hardy, and may be grown in the border. They are not particular about soil, and may be raised from seed or division in spring. Edulis (correctly Peruviana edulis), the greenish fruit of which is edible, is the Cape Gooseberry; it is not quite hardy.

Physostegia (phȳ-sostē-gia. Ord. Labiatæ). Hardy herbaceous perennials with creeping rootstocks. Virginiana, with toothed leaves and tubular red flowers in summer, height 1½ ft., is the best-known species; imbricata is the same thing and speciosa a variety; denticulata, with more deeply toothed leaves, and dwarfer, is another

variety. Ordinary friable soil. Propagation is by division in spring.

Phyteuma, Horned Rampion (phy-tēu-ma. Ord. Campanulaceæ). Hardy perennials, the smaller species of which are suitable for the rockery and the larger for the border. They are not particular as to soil. Propagation is by seed or division in spring. Comosum, blue, and Halleri, white, are good dwarf species.

Phytolacca (phy-tō-lacca. Ord. Phytolaccaceæ). Hardy herbaceous perennials. The species acinosa is a Himalayan plant with light pink or pale rose flowers, 3 to 4 ft. high. It is related to the better-known species decandra, the Virginian Poke Weed or Red Ink Plant, the latter name arising from the crimson juice in the purple berries. The foliage colours well in autumn. The white flowers are produced in summer. Height 5 ft. or more. Ordinary friable soil. Propagation is by division in spring, but it should be noted that the roots are poisonous. Plant in autumn or spring.

Phytophthora. Infestans is the fungus which causes what is known as Potato blight or disease. See Potato.

Picea (pī-cea. Ord. Coniferæ). See also Abies, to which the Piceas are closely related, and Spruce. The Piceas include several important timber trees, but their principal value in gardens lies in the horticultural varieties of the Norway Spruce, P. excelsa, and of P. pungens. These are prettily tinted, are of neat habit, and grow slowly, so that they are good for garden borders.

Garden Varieties. Amongst the best of the Piceas for garden purposes are excelsa argenteo-spica, which has silver-tipped leaves; e. aurea, with gold-tipped leaves; e. diffusa, very dwarf; e. pygmaea, pyramidal, dwarf; Morinda (Smithiana), one of the hardiest of the Spruces, and, like excelsa, good to plant as a sheltering tree; polita, a good lawn tree; pungens argentea, a silvery form of the Blue Spruce of the Rocky Mountains; p. glauca, a graceful little glaucous plant; and p. pendula, a weeping form of the preceding. These can all be bought from nurserymen at moderate prices. The forest Spruces are sold in quantity very cheaply.

Cultivation. The Piceas are not fastidious as to soil, but deep, sandy loam is best. Plant between October and March inclusive. Propagation is by seed sown in spring, but it is perhaps best left to nurserymen.

Picotee. See Carnation.

Pieris (pī-ē-ris. Ord. Ericaceæ). Handsome evergreen shrubs, suitable for shrubbery borders and special positions on lawns. They are naturally of compact habit. They like sandy peat, and may be propagated by layers in autumn. Floribunda (Andromeda floribunda and Leucothoë floribunda) with white flowers in spring is the popular species.

Pilea, Artillery Plant (pī-lea. Ord. Urticaceæ). The species muscosa is an interesting plant. The leaves are finely divided, and the flowers are small and reddish. If sprinkled with water when in full bloom, explosions follow, giving the effect of a miniature bombardment. It likes a warm house. Loam, with sand and a third of leafmould, suits. Propagation is by cuttings in bottom heat, or by seeds sown in a warm house or frame.

Pilewort, Ranunculus Ficaria, the Lesser Celandine.

Pilocereus. See Cactus (Pilocereus).

Pimelea (pī-mē-lea. Ord. Thymelaeaceæ). A genus of minor importance, but occasionally grown under glass in large places. With training, they make handsome exhibition plants, and are seen in collections of stove and greenhouse plants at some of the larger exhibitions. They like equal parts of peat and loam, with a great deal of sand. Propagation is by cuttings of young shoots, taken with a heel in spring and inserted in sandy peat under a bell-glass in a warm house. After flowering cut back to the hard wood, and repot when fresh growth starts. Rosea (Hendersoni), pink, and spectabilis, white or pale pink, are the two best species. Both bloom in late spring or early summer. They will thrive in a warm greenhouse.

Pimpernel. See Anagallis.

Pinching. A gardener's term for the stopping of shoots to encourage the production of side branches and to favour the plumping up of flower-buds into leaf-buds. Notes are made under the particular plants concerned.

Pine. See Pinus.

Pinguicula, Box Violet, Butterwort (pĭn-gwick-ula. Ord. Lentibularieæ). Insectivorous plants, flourishing in boggy places; the fleshy leaves are furnished with glandular hairs, and the fluid which exudes traps small insects. The hardy species should be given a site near the bottom of the rockery, where the conditions are cool and humid. The common hardy Bog Violet or Butterwort is vulgaris, which bears violet flowers in early summer. Grandiflora is also hardy. But caudata is the best, and it bears its carmine flowers in autumn. It is not hardy, and should be grown in a greenhouse in a compost of peat and Sphagnum moss. Propagation is by seed or division. A great deal of water is needed.

Pink (Dianthus plumarius. Ord. Caryophyllaceæ). Many of the hardy Pinks are popular. Mrs. Sinkins is still a universal favourite as a double white, Maurice Prichard is a fine single of a pretty pink shade, and the Munstead strain of single Pheasant-eyes are not only extremely pretty but very sweet. In addition, there are the old laced Pinks so beloved of our forebears. Garden Pinks are propagated by pulling young shoots (" pipings ") out of the sockets of the old plants and inserting them in moist, sandy soil outdoors in summer. They are hardy, healthy, and will thrive in almost any soil with the simplest treatment. The laced Pinks are more delicate, and need careful Carnation treatment (see Carnation). The hybrid Pinks known as Allwoodii bloom profusely and to some extent have the perpetual habit which ordinary Pinks lack. They are perfectly hardy. There are several named varieties and fresh appear at short intervals. The Indian Pinks (Dianthus chinensis) are biennials, and seed should be sown outside in May; there are several varieties. For Cheddar Pink and Maiden Pink, see Dianthus.

Pinnate. A pinnate leaf is one in which several leaflets grow from the sides of one footstalk. " Feathery " is a popular substitute.

Pinus, Pine (pī-nus. Ord. Coniferæ). The Pines are important both as timber and as garden trees. Among those planted for ornamental purposes are austriaca (Austrian Pine), Cembra, excelsa, insignis, Lambertiana, monticolor, Pinaster, Pinea, ponderosa, and Strobus

(Weymouth Pine). Laricio, the Corsican Pine, and sylvestris, the Scotch Fir or Pine, are almost entirely forest trees. There are good garden varieties of some of the above, notably Cembra aurea and C. pumila; Laricio aureo-variegata, green and yellow; L. pygmaea, a bushy form; Pinaster variegata; ponderosa pendula, weeping; Strobus fastigiata, pyramidal; S. nana, dwarf bush; sylvestris aurea, yellow in winter; and s. fastigiata, pyramidal. The Scotch Fir is a good tree for planting in peaty districts. Ponderosa is good for a very dry soil. The Austrian Pine thrives on chalk and bears exposure. Propagation is by seed and grafting, but is almost wholly done in the nurseries.

Pipes. See Greenhouses: Heating; and Drainage.

Pipe Tree. See Lilac and Syringa.

Pipings. Young shoots used for propagating; see Pink.

Piptanthus (pĭp-tăn-thus. Ord. Leguminosæ). A small genus of handsome evergreen shrubs, the most important of which is nepalensis, the evergreen Laburnum. It grows about 8 ft. high, and bears its yellow flowers in spring. It is best planted against a wall, as it is not perfectly hardy. Light, friable, well-drained loamy soil is desirable. Propagation is by seeds, cuttings of ripe shoots under a bell-glass in a frame, or layers.

Pistillate Flowers. Flowers devoid of stamens, and with pistils (ovary, style and stigma collectively) only, as in the female flowers of Melon, etc.

Pistol Plant. See Pilea muscosa.

Pisum, Pea (pī-sum. Ord. Leguminosæ). Pisum sativum is the green Pea, which see.

Pit. A sunk greenhouse, often quite small, with a sharp pitch and highly heated, as for Cucumbers. See also Greenhouses.

Pitcher Plant. See Nepenthes.

Pittosporum (pĭtt-ŏs-po-rum, commonly pitto-spō-rum. Ord. Pittosporaceæ). Evergreen semi-hardy shrubs, of which a few species may be grown outdoors, especially on sheltered walls. Crassifolium, brownish flowers in early summer, height 6–8 ft., and Tobira (chinense), white perfumed flowers in summer, height 8–12 ft., are the best known. Tenuifolium, blackish-purple flowers, 4 ft. high, proves hardy on clay soil in Hertfordshire. Undulatum, tapering leaves and white scented flowers in early summer, 8–10 ft., may also be mentioned. Ordinary friable soil, but preferably sandy loam and peat. Propagation is by cuttings in sandy soil in summer, with bottom heat. Plant in spring.

Plagianthus (plā-gi-ăn-thus. Ord. Malvaceæ). The one species of outstanding importance is Lyalli, a deciduous shrub with saw-edged leaves and drooping clusters of large white flowers with prominent golden anthers; height 12–15 ft. It is to be regretted that it is not perfectly hardy, but it is worth a sheltered place, such as a warm wall, and friable loamy soil with leafmould. The older shoots should be removed after flowering and the younger shoots will then flower well the following year. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in spring.

Plane, Platanus (plăt-anus. Ord. Platanaceæ). One of the most useful of trees, owing to the fact that it thrives so well in the smoke of towns, although it sheds its bark in winter. On this account it

has been planted more extensively than any other tree in large cities. What is called the London Plane is P. acerifolia, i.e. the Maple-leaved Plane; Suttneri is a variety of it with deeply cut leaves. P. occidentalis is the Western and P. orientalis the Eastern Plane. There are variegated forms of each. The Plane is not particular as to soil, and is of naturally good habit, needing little pruning to keep it in shape. Trees may be planted from November to March inclusive, and should be well staked.

Plantain, Plantago (plăn-tā-go. Ord. Plantagineæ). A troublesome weed, especially when it gets established on a lawn. It has long, fleshy roots, and breaking off the leaves is not much use unless a little vitriol or sulphuric acid is dropped into the heart afterwards. It is well to spud them out as fast as they appear, and then sprinkle on a little fresh grass and clover seed.

Plantain Lily. See Funkia.

Plasmodiophora (plas-mō-di-ō-phora). The fungus that causes club-root (ambury) in green vegetables, and "fingers-and-toes" in Turnips. See Ambury and remarks under Broccoli.

Platanus. See Plane.

Platycerium, Stag's-horn Fern (plăty-cē-rium. Ord. Filices). Handsome and distinct warm greenhouse ferns, with bold fronds, well suited to culture in suspended pans. The receptacle should be half filled with crocks, and the roots packed in with a mixture of fibrous peat and Sphagnum moss, lightened with sand, charcoal, and crocks —treatment that reminds one of Orchids. They like abundance of water. Propagation is by spores or buds on the roots. Alcicorne, with twice- or thrice-forked fronds, is the common Elk's-horn Fern; Hillii and majus are varieties of it. Grande is a fine species.

Platycodon, Chinese Bellflower (plăty-cō-don. Ord. Campanulaceæ). The only species, grandiflorum (Campanula grandiflora), is a fine Campanula-like plant, growing about 1 ft. high, with large blue flowers in summer. It is a hardy herbaceous perennial, suitable for the front of the border, and liking a friable soil. Propagation is by seed or division in spring. There are several varieties, of which Mariesii is one of the best; there is a white form of it.

Platystemon californicus (plăty-stē-mon. Ord. Papaveraceæ). A pretty, hardy, Poppy-like annual, about 1 ft. high, with yellow flowers in spring. Sow outside in spring in ordinary soil.

Platytheca (plăty-thē-ca. Ord. Tremandraceæ). The species galioides is an uncommon shrub with violet flowers, growing about 1 ft. high, and suitable for the greenhouse. Peat, with a little loam and sand, suits it. Propagation is by cuttings of young shoots inserted in sandy peat under a bell-glass in spring.

Pleione, Indian Crocus (plē-o-ne. Ord. Orchidaceæ). Pretty dwarf Orchids, with flowers on short stems. They form pseudo-bulbs annually, and are therefore herbaceous plants. They do well in pans partly filled with crocks, the roots packed in a mixture of fibrous peat and Sphagnum moss, with sand. Repot after flowering, at which time division may be practised. A good deal of water is required when the plants are in full growth, but the supply should be reduced when the plants begin to wither, and withheld altogether in winter. They should be grown in an intermediate house. The principal species is lagenaria, various colours, flowering in

winter. Maculata, purple and white, autumn bloomer, is also grown.

Pleroma (plē-rō-ma. Ord. Melastomaceæ). Evergreen shrubs, which thrive in an intermediate house in a compost of equal parts peat and loam, with a quarter part of sand. Propagation is by cuttings in a propagating case. Elegans, with blue flowers in summer, is now called Tibouchina elegans by botanists. Macranthum (Tibouchina semidecandra), with violet flowers, is also good.

Plum (Prunus domestica or communis. Ord. Rosaceæ). The Plum is the most important of the fruits which form " stones " instead of pips, and in some districts, notably around Pershore, Evesham, and Maidstone, hundreds of acres are grown for market. It loves a strong loam. A certain amount of lime in the soil benefits it, but it is not at its best on shallow limestone soil, which is not fertile enough. 3 or 4 ft. depth of good loam, with limestone underneath it, will grow Plums to perfection if the site is suitable. It must be remembered that in common with the other stone fruits, Apricots, Cherries, Peaches, and Nectarines, the Plum flowers earlier than Apples, and is liable to suffer severely from frost on a low site. The remarks as to planting and staking under Apples apply to Plums.

Stocks. Plums are generally worked on to Mussel stocks of an improved non-suckering type, although several others, such as St. Julien, Brussels, Brompton, Myrobalan, and Pershore, are used for particular varieties by experts. They are grown as standards, half-standards, bushes, and fans, more rarely as cordons and espaliers.

Pruning. After the early pruning to form heads referred to under Apples, Plums do not require much pruning as standards, half-standards, and bushes, because the quantity of summer shoots which they produce is much smaller, as a rule, than in the case of Apples and Pears; on the other hand, the quantity of fruit spurs and stubby shoots which naturally develop fruit-buds is much greater. Where there is a good deal of summer growth, summer pruning will be beneficial.

Enemies. The Plum is not addicted to canker, scab, spot, American blight, codlin grub, and blossom weevil like the Apple, but it is attacked by caterpillars, aphides, " silver leaf," brown-rot, and gum. Caterpillars of the March Moth, Mottled Umber Moth, and Figure-of-eight Moth may attack Plums in spring. Spray with 1 lb. arsenate paste in 25 gallons of water. Spraying with nicotine and soft soap (see Nicotine) will check aphides. Silver leaf is a dangerous enemy, which gets into the system of the tree and causes the leaves to assume a grey, shiny appearance. If the disease puts in an appearance, an endeavour should be made to check it by promptly cutting out the affected part and burning it. Should purple overlapping scales appear on a withering branch, burn it at once, in fact the whole tree should be burned if there is much of the disease. No other stone fruit should be planted on the same spot. See also Silver-leaf. Blossom-wilt and Brown-rot are two stages of the same fungus, wilt being Sclerotinia (Monilia) cinerea, and rot Monilia fructigena. Plums often decay in large numbers on the trees just when they should be ripening, and if not removed (as they should be) will hang in mummified clusters till spring, when spores are released and the disease spread. Apples are also affected. Cox's Orange

Pippin, James Grieve and Lord Derby are susceptible to the early wilt stage and many varieties to the late or fruit stage. Both in the case of Apples and Plums diseased fruit should be gathered and destroyed. Bordeaux Mixture (1 lb. sulphate of copper, 1 lb. fresh lime, 10 gallons of water, for method of mixing see Bordeaux Mixture), applied in spring, is a good remedy. If aphis is also present add ¾ oz. nicotine extract, 95–8 per cent strength. See Nicotine.

Varieties. The following are good cooking Plums, approximately in order of use: (1) Rivers's Prolific, (2) Czar, (3) Pershore, (4) Purple Egg, (5) Victoria, (6) Pond's Seedling, (7) Monarch, (8) President. Nos. 3 and 4 resist silver-leaf; No. 5 is very susceptible. The following are of particularly good flavour, and suitable for dessert: Greengage, Early Transparent, Late Transparent, Bryanston Gage, Jefferson's Gage, and Coe's Golden Drop.

The Cherry Plum (Prunus cerasifera) is sometimes grown profitably but is not of first importance.

Plumbago, Leadwort (plum-bā-go. Ord. Plumbagineæ). Pretty plants, some evergreen, others herbaceous, some hardy, others needing a greenhouse or hothouse. The hardy sorts are not fastidious as to soil. Loam, with sand and a third of leafmould, will suit the tender kinds. The herbaceous species may be propagated by division in spring, the shrubs by cuttings in a propagating case in spring. Capensis, with blue flowers in summer and autumn, is a great favourite; it is sometimes planted out to ramble up a pillar or on a greenhouse roof, in other cases grown in pots and trained on a balloon-shaped wire trellis. After flowering it should be pruned back annually to the old wood. There is a white variety, alba. The variety superba, which has rosy flowers in winter and spring in a warm greenhouse, can be made into neat bushes if raised from cuttings, pinched and repinched. Larpentae, blue; and micrantha, white, are both hardy herbaceous species and flower in summer.

Poa. See Smooth-stalked and Rough-stalked Meadow Grasses under Grass.

Podocarpus (pō-dō-cār-pus. Ord. Coniferæ). A large genus of evergreen Conifers, not hardy, and therefore only suitable for outdoor cultivation in mild districts. Alpina, latifolia, macrophylla, nubigena, nucifera, and Totara are among the hardiest. A compost of loam and peat is suitable. Plant in spring.

Podophyllum (pō-dō-phy̆ll-um. Ord. Berberideæ). Two species of Duck's-foot are grown, viz. Emodi and peltatum. The former is remarkable for its large, reddish, egg-shaped fruits, which are borne in late summer. They are hardy herbaceous perennials, suitable for the rock garden, and are propagated by division in spring.

Poet's Narciss. See Daffodil.

Poinsettia (poin-sĕtt-ia. Ord. Euphorbiaceæ). A brilliant plant, the carmine bracts of which do duty for flowers, and do it in a way that the most showy flowers could not excel. They form a large, flattish head of the most vivid colour. The Poinsettia likes a warm, moist temperature, and is hardly suitable for the small " mixed " greenhouse of the amateur.

Propagation. It is best to grow a batch in a hothouse, raising them from pieces of the old stem, which should be cut up and put in sandy soil in bottom heat in spring; or from side shoots taken off

when old plants break into growth late in spring, also in bottom heat.

Compost. Loam, with sand and a third each of leafmould and decayed manure, suits. The cuttings may be put singly in small pots, shifted when rooted to 5-in., and from those to 8-in. The plants may be kept in a frame in summer, and put in a warm house in late summer to bloom. Pulcherrima is the only species, but there are several varieties of it, major being one of the best.

Poison Ivy and Oak. See Rhus toxicodendron.

Polemonium, Jacob's Ladder, Greek Valerian (pō-le-mō-nium. Ord. Polemoniaceæ). Useful plants for the border and rockery, of which the most popular species is caeruleum, a blue perennial, 2 ft. high, blooming in July. There are several varieties of it, including a white and a variegated. Confertum is a nice rockery plant, with blue flowers in summer, 6 ins. high. Richardsoni (humile), blue, 1 ft., is a good border or rock plant. Reptans bears satiny blue bell-shaped flowers in May; height 9 ins. Flavum, yellow, 1½ ft., and pauciflorum, yellow, 1½ ft., may also be mentioned. Sandy loam is suitable. Propagation is by seeds or division in spring.

Polianthes, Tuberose (pō-li-ăn-thēs. Ord. Amaryllideæ). See Tuberose.

Pollen. The fertilising grains borne on the stamens of flowers. In most cases the pollen is in separate grains, in Orchids it is in masses. See Hybridisation.

Pollination. The application of pollen to the stigma of a flower. See Hybridisation.

Polyanthuses and other Hybrid Primulas. The garden forms of Auricula, Oxlip, Polyanthus, Primrose, and other hardy hybrid Primulas present us with a valuable set of spring-blooming plants, low in habit, profuse in bloom, beautiful and varied in colour. Gardeners love them as the general public love the little Primrose of the woodland, so exquisite in its cool, dense tufts. The paste-flowered Auriculas of the florist may be passed over for garden purposes, but not so the large coloured hybrids such as Giant Yellow, Invincible, Laced, and even " Dusty Miller " with his mealy foliage, for these plants make delightful beds and are charming as a groundwork for late Tulips and also for Tea Roses. See Auricula.

Polyanthuses. The bunch-flowered Primroses generally called Polyanthuses are even better, and whatever the spring garden lacks it must have its quota of these glorious flowers. Giant strains of yellow, orange, crimson, scarlet, cream, white, rose, blue, mauve, and purple can be obtained separately. Blue Beauty is very fine. Or a mixed strain such as the Munstead may be procured. These fine modern strains throw their huge clusters of bloom to a height of 15 or 18 ins.

Primroses. Again, there are the true Primroses, which bear their flowers singly on the stems: these give brilliant reds and a fine blue, in addition to light colours. The habit is lower and denser than that of the Polyanthuses. Cream and yellow Primroses of the modern large-flowered strains form an exquisite groundwork for white, yellow, and orange Tulips; and they also look well among Tea Roses. A cream Primrose mixed with the pale Narcissus albicans makes a lovely bed.

Propagation. Perhaps the best way of raising these splendid plants,

Auriculas, Polyanthuses, and Primroses alike, is to sow the seed in boxes in February and put in a cold frame, set the seedlings out 9 ins. apart in a nursery bed in June and transplant to the flowering positions in September. The season can be lengthened by picking off the seed pods as fast as they form. The plants will probably improve the second year, but afterwards may deteriorate to some extent; anyway, it is easy to raise a fresh stock every year or two.

After Flowering. In cases where they are bedded it is necessary to move them after flowering, and for a time, especially if the position is a hot one, they will diminish in size, but in autumn they will begin to develop again, and in mild spells throughout the winter they will extend more, until, with April, they attain to their full size. And growth will not stop with the commencement of flowering.

See also Primula.

Polygala, Milkwort (pō-lĭg-a-la. Ord. Polygaleæ). Showy plants, one of the most popular of which is myrtifolia grandiflora (Dalmaisiana), which produces purple flowers in spring. It is an evergreen and needs greenhouse culture. Propagation is by cuttings of the young shoots in spring under a bell-glass. Peat, with sand and a third of loam, suits.

Polygonatum, Solomon's Seal (poly-gō-nā-tum. Ord. Liliaceæ). See Solomon's Seal.

Polygonum, Knotweed (pō-lĭg-o-num. Ord. Polygonaceæ). A large genus which comprises some very useful plants, differing widely in habit. Affine (Brunonis), for example, is a dwarf hardy perennial, with rosy flowers in autumn; while baldschuanicum is a hardy perennial climber, growing rapidly on trellises and arbours, and bearing a cloud of white flowers in summer and autumn; these are two of the best. Other good hardy species are alpinum, a low rock plant with white flowers in summer; cuspidatum, a tall border perennial with white flowers in summer; and sachalinense, a tall perennial with greenish-white flowers in summer. They will grow in almost any soil, and are propagated by seeds or division in spring. Orientale is a beautiful annual with drooping rosy racemes like bunches of red Currants, 3 ft. high; if seed is procurable it may be sown outside in spring to bloom late in summer.

Polypodium (pōly-pō-dium. Ord. Filices). The largest of the fern genera, mostly evergreen, but including a few deciduous kinds. Loam, with sand and a third leafmould, suits the majority. Propagation is by spores or division in spring (see Ferns).

Select Species. Aureum needs a warm greenhouse or hothouse; it bears yellow scales on the rootstock; several varieties, Mayi being good. Dryopteris is the British Oak Fern, and is deciduous; it is a prettily cut hardy species; Robertianum is a scented variety of it. Phegopteris is the British Beech Fern, and is partially, though not wholly, evergreen. Picotii, with broad fronds, is a good greenhouse species. Schneideri is a handsome hybrid, with triangular fronds, greenhouse. Subauriculatum is one of the best, and makes a splendid basket fern. Vulgare is the common Polypody or Wall Fern; there are numerous varieties of it.

Polystichum (pōl-ȳs-ti-kum. Ord. Filices). This genus of ferns is now merged in Aspidium. The most popular species are aculeatum and angulare. For culture, see Ferns.

Pome. A large fleshy fruit with pips in the place of a stone, as in Apple and Pear. See also Drupe.

Pomegranate, Punica granatum (pū-ni-ca. Ord. Lythraceæ). The Pomegranate is the fruit of the deciduous tree named, which bears beautiful nearly stalkless red flowers in summer, and may grow 15 ft. high on a warm wall; fruit rarely matures in Great Britain, and the fruit sometimes seen in the markets is imported. There are several varieties, including a double, and this, grafted on to the single, is preferred by gardeners. Friable loam is the most suitable soil. Plant in spring.

Pondweed, Cape. See Aponogeton distachyon.

Poplar, Populus (pŏp-ū-lŭs. Ord. Salicineæ). Useful deciduous trees of rapid growth. The two best-known kinds, both much planted in towns, are the Black Poplar, Populus nigra, and the Black Italian, P. serotina (hybrid nigra and monilifera). The Lombardy Poplar, nigra pyramidalis, is a good town tree, of columnar habit; if young trees are headed at about 8 ft. high they throw out small branches right up the stem, and soon make a screen if planted 3 to 6 ft. apart. Canadensis is the Canadian Poplar. Alba, of which there are many varieties, is the White Poplar or Abele; it likes a moist place. Balsamifera is the Balsam Poplar. Monilifera is the Necklace Poplar. Tremula is the Aspen (see Aspen). Among modern species may be mentioned lasiocarpa, heart-shaped leaves and red-tinted leafstalks, likes a moist place; alba Richardii, upper surface of leaf yellow; Koreana, red midribs; and szechuanica, lower surface of leaves flushed with red. They like well-drained loamy soil, but are not very particular. The Aspen thrives on clay. Propagation is by cuttings, seeds, layers, and grafting, but is generally left to nurserymen. The Black Italian Poplar strikes readily from cuttings inserted outside between October and February.

Poppy. See remarks under Papaver.

Poppy Anemone. See Anemone.

Poppy, Californian. See Platystemon californicus.

Poppy, Horned. See Glaucium luteum.

Populus. See Poplar.

Portugal Laurel. See Laurel and Prunus.

Portulaca (pōr-tŭ-lac-a. Ord. Portulaceæ). Charming half-hardy annuals, 6 ins. high, with single and double flowers of brilliant and varied colours, thriving in sunny spots. Sow in a pan of fine soil in February, prick off 3 ins. apart in boxes, and plant out in May.

Potato (Solanum tuberosum. Ord. Solanaceæ). Admittedly the most important of all vegetables, the Potato is also often one of the most disappointing, owing to its tenderness and liability to disease. Given warm, dry weather from April to August there is no cause for anxiety, but in a cold spring there is the fear of frost, and in a wet summer of blight. If there is a choice of site it is well to plant the first crop on a sheltered south or west border in February, then it is possible to dig in May in mild districts. In cold, exposed places it is not prudent to plant before April. Potatoes will thrive in both light and heavy soils if friable, but damp sites should be avoided.

Soil, Manure, and Planting. The ground should be dug deeply, and if lacking humus given 2 cwt. per rod of decayed manure, supplemented by 6 lb. of Complete Fertiliser (see under Manures) per square

rod, applied in February, the whole turned well in. The drills for early varieties may be drawn 2 ft. and those for late ones 3 ft. apart, all 4 ins. deep, then with a light ridge of soil over all the seed tubers will be covered 5 or 6 ins. The sets may be 1 ft. to 18 ins. apart. Supposing all has gone well, when the plants are 8 or 9 ins. high, soil should be drawn up to the tips.

Diseases. If the spring growth of the Potatoes is satisfactory, they may be expected to continue until July without giving cause for anxiety, but subsequently their health will depend on the weather. With warmth and drought they will be safe, but with cold and wet they will be in danger from summer and autumn blight, Phytophthora infestans. If the leaves become blotched and partially curled, with brown patches on the underside which give off a disagreeable musty odour, this destructive fungus is at work. There is little hope for the plant if the leaves become badly infected, and the best thing is to lift the crop in August if it is fairly advanced. But fortunately there is a preventive in the fungicide Bordeaux Mixture, and so beneficial is it apart from its direct action on the fungus, that, wherever possible, it should be applied whether the weather is threatening or not. A spraying at the end of June can do nothing but good; why, then, do growers shirk it? Probably because the process is unfamiliar and consequently irksome. But let us be fair and admit that in small cultures the price of a knapsack sprayer is serious. In such a case, let the grower see what he can do with a No. 3 gas burner brazed on to an old syringe. Whatever instrument will distribute the fluid in a fine spray without becoming clogged will answer the purpose. Bordeaux Mixture is prepared by dissolving 9½ lb. of freshly burnt lump lime in water, dissolving simultaneously, but in a separate wooden vessel, 14 lb. of sulphate of copper in water, and then pouring the two solutions together, bringing the total quantity of water up to 100 gallons. This would be enough for an acre in June. Many would find a much smaller quantity suffice, keeping the same proportions. If the sprayer which is being used does not automatically apply the fluid to the underside of the leaves, the tops must be turned back so that it may get underneath. One application will suffice if the weather remains dry, but with much rain in July another spraying ought to be given, when a larger quantity per acre will be needed.

Leaf-roll or Curl, identified by stunted growth and curled foliage; and Mosaic, denoted by mottled green and yellow foliage, are virus diseases, that is, diseases the organism of which passes a Pasteur Chamberland filter and has not been discovered. It is known, however, that the aphis Myzus persicae (Peach aphis) is a medium through which the diseases are spread. There is no efficacious dressing, safety lies in fresh stocks of seed from selected sources. Scab in its various forms, of which the commonest is Actinomyces scabies, attacks the skin and under layer of the tubers. As it is encouraged by heavily manured acid soils, lime may be used, but only on a fallow, as if used in spring when the crop was planted it might itself cause the disease, as may gritty substances such as coal ashes, sand, and gravel. A light dressing of sulphur in the drills at planting time has done good in certain cases. Black Scab or Wart Disease is more destructive, but fortunately only attacks

certain varieties; in districts, therefore, where it is prevalent it may be warded off by purchasing immune sorts, which are indicated in dealers' lists. Winter-rot may spread in the pits, and where there has been past trouble the tubers should be dried as thoroughly as possible and dusted with quicklime or sulphur before they are stored. For ground grubs see Wireworm, Leather-jacket, and Surface Caterpillars.

Lifting and Storing. The crop will be ready for lifting when the leaves, being free from disease, turn yellow; the period will vary with the sort and district. Early sorts are frequently lifted while the tops are green, but it is generally at the sacrifice of flavour and quantity. Tubers to be stored for future use should be allowed to lie in the sun until the skins are set, but no longer, otherwise they will turn green; and in such a state they are not good for food, although suitable for seed. Seed Potatoes may be stored in a light place, but food tubers should be put in a heap when dry, and covered with straw and soil. All must be kept safe from frost.

Forcing. If very early Potatoes are wanted, tubers which have been sprouted in boxes in a light frostproof place may be put in large pots and placed in a warm greenhouse, or planted in a frame. Three small seed tubers of an early variety may be set equidistant in an 8-in. pot, and covered with 2 ins. of friable soil. When the crop is ready, and with the soil firm and moist, the pots may be turned upside down, tapped, and lifted off the ball so as to give access to the roots, from which the small tubers which have formed can be picked; the plant grows away as before after the pot has been replaced.

Seed Tubers. Growers should not generally use sets of their own saving, but should get fresh seed every year, preferably from a different soil and district, otherwise it will be found that the crop deteriorates. Good varieties:

Early	*Medium*	*Late*
Eclipse	Great Scot	Arran Banner
Midlothian Early	King Edward	Kerr's Pink
Sharpe's Express	Majestic	Up-to-date

See also dealers' specialities and new varieties.

Potato Onion. See Onion.

Potentilla, Cinquefoil (pō-ten-till-a. Ord. Rosaceæ). Charming plants, several good species and hybrids being hardy and suitable for the border and rock garden. They have Strawberry-like foliage and brilliant single or double flowers. They will thrive in any good garden soil; for the alpines it should be gritty. Propagation is by seeds or division in spring. Ambigua, yellow, 6 ins. high, early summer; fruticosa, a shrub 3 to 4 ft. high, yellow flowers in summer (mandschurica is a fine white form); Friedrichseni, yellow, a hybrid; nepalensis (formosa), 18 ins., pink flowers in summer; and nitida, 4 to 6 ins., rose flowers in summer, are a few of the best species. Miss Willmott is a good variety of nepalensis, silky rose in colour. Among modern kinds, Breweri, yellow, 9 ins.; Farreri prostrata, yellow, 9 ft.; Vilmoriniana, white, silvery leaves, 3–4 ft.; Purdomi, yellow; and such dwarf forms of fruticosa as davurica, white; Farreri, yellow; arbuscula, yellow; and Veitchii, white, may be mentioned.

Poterium (pō-tē-rium. Ord. Rosaceæ). Hardy herbaceous perennials, of which the species canadense, with feathery foliage and white flowers in summer, 3–4 ft. high; and Sanguisorba, purplish green, 1½ ft., the Salad called Burnet, are the best known. Chalky or lime soil is preferred. Propagation is by seed or division.

Pots. See Flower-pots.

Potting. A gardening operation well worthy of study. As a rule, the first pot of a young plant, whether from seed or cutting, should not exceed 3 ins. across (for this and other sizes, see Flower-pots). Unless in special circumstances, the shift from this may be to a 5-in., from that to a 7-in., and from that to a 9-in. or 10-in. if further repotting is necessary. Economy in time and material may be effected by shifting from a 5-in. to an 8-in. if watering is carefully done until the plants are rooting freely again (see Watering), otherwise the soil might become sour. It is desirable that the pots should be clean inside as well as out; if dirty the roots bind on the bottom and are torn in repotting. Generally speaking, plants need repotting when roots show freely at the drainage hole. The fresh soil should be pressed firmly round the roots. See also Drainage and Soil.

" Potting-off " is transferring a box-seedling to its first pot.

" Potting-on " or " shifting " is moving a pot plant to a larger pot.

Pratia (prā-ti-a. Ord. Campanulaceæ). A small genus of semi-hardy herbaceous perennials, of which angulata, a creeper with white flowers in early summer; and begonifolia, a creeper with Begonia-like leaves and violet berries, are the best known. They like a sheltered place and a friable loamy soil. Propagation is by division in spring.

Pricking-out. A term applied to the operation of transplanting seedlings from the pots, pans, or boxes in which the seeds were sown, 2, 3, or 4 ins. apart in other boxes; or from a seed-bed to a nursery-bed. It should be done before the plants spoil each other by crowding.

Prickly Pear. See Cactus (Opuntia).

Primula, Primrose, Polyanthus, Auricula (prĭm-u-la. Ord. Primulaceæ). A large and very important genus, including, as it does, one of our most valuable winter-blooming indoor plants in the Chinese Primrose, Primula sinensis; the popular greenhouse species obconica, and a host of hardy species, beginning with the common yellow Primrose of the woodland. The Primulas give material to the greenhouse owner, the rock gardener, and the spring bedder.

Primulas in Pots. There are now many forms and colours of the Chinese Primrose, and those who have plenty of glass, and want a good selection of sorts, may grow the Fern-leaved as well as the ordinary section, and likewise various distinct colours, perhaps also some doubles. The Star Primulas should not be overlooked. A person with one house might do well to order a packet of mixed seed of the Chinese Primula. By making sowings at intervals in spring in a greenhouse it is possible to get a succession of bloom. The plants thrive in a cool house, or even frame in the summer, and should be kept cool and moist in dry weather. Placed singly first of all in 3-in. pots, they may be transferred to 5-in. and 6-in. Loam, with a fourth of leafmould, a little dried cow manure, and sand, make a suitable compost. The plants may be set fairly deep, without, however, burying the leaf-stems. They have a tendency to

get bare at the collar and rock about, which deep setting prevents. They will flower in winter and spring. It is rarely worth while to keep old plants after blooming, as they tend to get loose and scraggy. Young stock is much better. Unlike the border Primroses, this species does not form a thick tuft of offsets. The double white Primula does so, and may be propagated by division.

Primula obconica. A beautiful species, good for a greenhouse in summer, and sharing with the Chinese Primrose the merit of doing good service in a room window when in bloom. It should be handled with caution, in potting, etc., however, as it causes a painful rash on the hands of some people, while having no ill effect on others. It may be raised from seed in spring.

Hardy Species. The rock gardener has a splendid lot of material to his hand in the hardy species, which produce charming flowers among the stones. The following are beautiful species, and in the case of most seed is procurable, which may be sown in a frame or greenhouse as soon as it is ripe, or in spring; those of tufty habit may be divided when established; the best time for this is in spring, after flowering: capitata, violet, 9 ins., spring; cortusoides, rose, summer, 6 to 9 ins., with varieties amoena and President Simon; denticulata, lilac, spring, 1 ft., there are several varieties, including Cashmeriana; farinosa, the Birds' Eye Primrose, purple with yellow eye, 9 ins.; japonica, crimson, 18 ins., with white and other forms, late spring; luteola, small yellow, 6 ins.; marginata, violet, 3 ins., late spring, and white variety alba; minima, pale rose, 2 ins., summer; rosea, rose, 6 ins., spring; sikkimensis, yellow, 2 ft., summer; Sieboldii, various colours, 9 ins., spring; viscosa (villosa), rose, 3 ins., summer, and its fine mauve form, Mrs. J. H. Wilson. The following are interesting newer species: Beesiana, magenta; Bulleyana, orange, 1 ft.; Cockburniana, salmon, 9 ins., a biennial, best raised from seed annually; Florindae, yellow, 3 ft., bog; Forresti, orange, 1 ft., fragrant; Listeri, lilac, 6 ins., and white variety; lichiangensis, purplish red, 6 ins.; Littoniana, lilac to purple, 1 ft.; malacoides, pinky lilac, long spike, and varieties, hardy, but often grown in pots; microdonta, white to purple, and form violacea; pulverulenta, violet, resembles japonica; Veitchii, rose, like cortusoides; Waltoni, red, moisture and shade; and Winteri, lavender, powdered leaves, 4 ins. high. Unique and Lissadell Hybrid are beautiful crosses between Cockburniana and pulverulenta, Lissadell Hybrid resembles japonica but is paler in colour.

Greenhouse Species. Floribunda, yellow, 6 ins., spring; Forbesii, lilac, yellow eye, 6 ins., summer; kewensis, a hybrid between verticillata and floribunda, yellow, 1 ft., spring; and verticillata, yellow, 18 ins., spring, the Abyssinian Primrose.

For the border Primroses, Polyanthuses, Oxlips, and Auriculas, so easily raised from seed in spring and planted in autumn to make beautiful spring beds, see Polyanthus. The Primrose is Primula vulgaris (acaulis), the Auricula is P. Auricula, the Polyanthus is a hybrid between Primrose and Cowslip, the Oxlip is P. elatior, and the Cowslip is P. officinalis (veris).

Prince's Feather. See Amaranthus hypochondriacus.

Privet, Ligustrum. See Hedge and Ligustrum.

Propagation. The various methods of propagation, such as by budding,

cuttings, division, grafting, layering, seeds and suckers, are dealt with under the various plants concerned throughout the book.

Propagator. The nursery " propagator " is a human being, the amateur's " propagator " is generally a small shallow frame in a warm corner of the greenhouse, perhaps over the hot-water pipes; roofing slates with 6 ins. of moist coco-nut-fibre refuse form a suitable bed. Or it may have a shallow zinc tank below, beneath which a lighted oil-lamp is placed for heating the water. The propagator may be kept close at night, but there should be a little ventilation during the day to prevent the seedlings or cuttings damping-off: this is a matter in which the gardener must exercise judgment and care.

Protoplasm. The colourless, flavourless, jelly-like substance which is the base of plant life. See a modern work on Botany.

Prumnopitys (prŭm-nŏp-itys. Ord. Coniferæ). A small genus of Yewlike Conifers, of which the species elegans, growing 20 ft. high or more under favourable conditions, such as a sheltered place and friable loamy soil, with peat and leafmould, is the best known. Others are spicata and taxifolia. Plant in autumn or spring.

Prunella, Self-heal (prū-nell-a. Ord. Labiatæ). Hardy perennials, of which the best known is grandiflora, with purplish-mauve flowers in summer, height 9 ins. It is easily grown in the rock garden, and may be propagated by division in spring.

Pruning. The different kinds of fruit need such varying methods of pruning that we have dealt with the subject under each kind. See Apple, Cherry, Currant, Grape, etc. See also Hedges and Shrubs.

Prunus (prū-nus. Ord. Rosaceæ). A large and highly important genus, including as it does such fruits as the Apricot, Cherry, Peach, and Plum; such handsome trees as the Almond; and such shrubs as the Laurel. P. Amygdalus is the Almond, P. Armeniaca the Apricot, P. Avium the Wild Cherry or Gean, P. Cerasus the Cherry, P. Padus the Bird Cherry, P. Persica the Peach (with which is included the Nectarine), P. communis (or domestica) the Plum, P. laurocerasus the Common or Cherry Laurel, P. lusitanica the Portugal Laurel, P. cerasifera the Myrobalan or Cherry Plum, and P. spinosa the Sloe. The fruits and ornamental shrubs and trees are dealt with under their own names.

Ornamental Prunuses. Several species and varieties are grown as ornamental plants, and among these may be named the double red variety of Persica called Clara Meyer; the rose form of Armeniaca triloba and its double variety; Cerasus Rhexii flore pleno, the double white Cherry; pseudo-cerasus (Watereri) and its fine light pink varieties Shirofugen and James H. Veitch, all of which may be grown in pots and gently forced into bloom in winter or early spring. Loam, with sand and a third of decayed manure, will suit them. They are also good for the shrubbery. Cerasifera atropurpurea (Pissardii) is a small Plum tree with purple leaves; it is good as an ornamental standard for the shrubbery and lawn, and is much planted in suburban and villa gardens. Other ornamental Prunuses are Mume (Japanese Apricot), white, and forms; Padus Albertii, single white; Avium flore pleno, double white; and japonica (Japanese Cherry), double white and rose. Among modern kinds may be named incisa, Lannesiana, Sargentii, serrula, and sub-hirtella.

Pseudo-bulb. The swollen, bulb-like stem of an Orchid.

Pseudolarix, Golden Larch (pseudo-lā-rix. Ord. Coniferæ). The one species is Kaempferi (Larix Kaempferi), a hardy Larch-like Conifer growing 20 ft. high or more, with leaves which are bright green in spring and yellow in autumn. It is a very ornamental tree, thriving in sandy loam. Plant in autumn or spring.

Pseudostuga (psēudo-stū-ga. Ord. Coniferæ). This genus is important through containing the Douglas Fir, once called Abies Douglasii, but now called Pseudostuga Douglasi by botanists. There are several varieties of this handsome Conifer, and brevifolia, pendula, glauca, and Stairii may be mentioned as good. It is a handsome tree for a park or a large lawn, as well as a valuable timber tree.

Psila rosae, Carrot fly. See Carrot.

Psylla. A small insect, sometimes called the Apple Sucker. See Apple enemies.

Pteris, Brake Fern, Ribbon Fern (tē-ris. Ord. Filices). A large and very useful genus of ferns, comprising several of our most popular greenhouse, room, and table kinds. They vary greatly in appearance, and also in requirements, some being hardy, while others require a warm house. The indoor species thrive in equal parts of loam and leafmould, with sand. Propagation is by spores (see Ferns). Those which produce creeping rhizomes may be divided in spring. Small plants are charming for dropping into ornamental bowls for side tables.

Species and Varieties. The following are a few of the best: Aquilina is the common Brake Fern or Bracken, and is hardy; cristata is a crested variety of it. Cretica and its varieties form a popular set; the type has pale green leathery fronds, and succeeds in a warm greenhouse or fernery; albo-lineata, with central band of silver; Mayi, crested; and Wimsetii, tips forked and crested, are good varieties of cretica. Ensiformis Victoriae is prettily variegated. Quadriaurita is a handsome species; its variety argyraea is variegated, while rubricaulis has red stipes. Serrulata is a graceful species which likes a warm house; its variety cristata has crested fronds, and is very popular in the markets and for table decoration. Tremula is one of the best ferns we have for a greenhouse or room, and there are several nice varieties of it, notably elegans, flaccida, and Smithiana. Longifolia, a greenhouse species, is a popular fern, much grown for the markets.

Pterostyrax. See Halesia.

Pulmonaria, Lungwort (pulmon-ā-ria. Ord. Borragineæ). Useful hardy perennials, suitable for the border. Officinalis, the reddish-violet Bethlehem Sage, is the best known; it grows about 1 ft. high, and blooms in spring; there is a white variety; the leaves are spotted with white. Angustifolia azurea, 6 ins. high, and the rosy salmon form rubra are good; also arvernensis, purplish blue, and white variety alba; and montana (mollis), blue, 1 ft. Any fertile garden soil will do. Propagation is effected by division in spring. Sibirica is synonymous with Mertensia sibirica, and virginica with M. pulmonarioides. See Mertensia.

Punica. See Pomegranate.

Purslane (Portulaca oleracea. Ord. Portulaceæ). The leaves of this little plant are sometimes used in salads. Sow outside in spring. Ordinary soil.

Puschkinia scilloides (pūsch-kĭn-ia. Ord. Liliaceæ). A pretty little Scilla-like bulb growing about 6 ins. high, and bearing white flowers striped with pale blue in spring; compacta (libanotica compacta) is a variety. They will thrive in well-drained garden soil, and are propagated by offsets. They are charming little bulbs for the rockery, and may be grown in pots if desired.

Pyracantha. This is Crataegus Pyracantha (which see). Crenulata yunnanensis is a fine modern species with crimson fruit in winter; it is evergreen, best grown on a wall.

Pyrethrum, Feverfew (pȳ-rē-thrum. Ord. Compositæ). A large and important genus, separated from Chrysanthemum by so narrow a line that modern botanists have brushed it aside and merged the two. The most important to the flower-gardener are the single and double varieties of roseum, which florists have developed. These hardy herbaceous perennials are early growers and bloomers, have beautiful flowers, and will bloom a second time if cut back after the first flowering. They are grand plants for the front of herbaceous borders, growing 2 ft. high or more in good soil, and bearing large quantities of flowers. They will thrive in most soils, and are easily propagated by splitting up the clumps when they start growing, which may be at midwinter. Parthenifolium aureum is the Golden Feather (see Golden Feather). Parthenium, with white flowers in early summer, is the common Feverfew. Tchihatchewii, a dwarf plant with white flowers in summer, is a good plant for dry banks. Uliginosum is a tall, late-blooming perennial with white flowers. See also Chrysanthemum.

Pyrola, Wintergreen (pȳ-rō-la. Ord. Ericaceæ). Hardy herbaceous perennials, useful for the rockery. Rotundifolia is the best-known species, it grows about 6 ins. high, and has fragrant white flowers in summer; arenaria, a native of the seaside, is a variety of it.

Pyrus (pȳ-rus. Ord. Rosaceæ). A large and most important genus, including, as it does, those popular fruits the Apple and Pear (which see). The Apple is P. Malus, the Pear P. communis. Several of the Pyruses are grown as ornamental trees for lawns and shrubberies, and among these may be mentioned Aria, with white flowers in spring, the white Beam tree, several varieties, good for chalk, variety chrysophylla has yellow leaves; Aucuparia, the Mountain Ash or Rowan, so much admired for its red fruits in autumn, several varieties, including one with pendulous branches and one with yellow fruit; floribunda, a free-blooming tree with rosy flowers in spring, charming in bud; japonica (Cydonia japonica), the Japanese Quince, good for walls, large scarlet flowers in spring; Maulei, orange flowers and yellow fruits; Sorbus, creamy flowers and red fruits, the true Service Tree; and spectabilis, light red flowers in spring, also its double form flore pleno. P. baccata is the Crab (see also Crabs), P. prunifolia the Siberian Crab, P. torminalis the Wild Service Tree, P. Cydonia the Quince, and P. germanica (Mespilus germanica) the Medlar. Three particularly handsome flowering trees are floribunda and its forms; spectabilis and its forms, and Scheideckeri, a hybrid Apple with rose flowers. Angustifolia, blush, narrow leaves, and its double form, may also be mentioned.

All the Pyruses thrive in well-drained loamy soil; as a class they do not care for stiff, damp soil.

Q

Quaking Grass. See Briza under Annuals: Ornamental Grasses.

Quamash. See Camassia.

Quassia. Quassia chips, the product of Picraena excelsa, form a useful insecticide; if a handful are soaked in a gallon of cold water for a few hours they make a "bitter" which destroys aphides; or they may be boiled with soft soap, ½ lb. of each to 10 gallons of water.

Queen of the Meadows. See Spiraea Ulmaria.

Quercus, Oak (quēr-cus. Ord. Cupuliferæ). The noblest of our forest trees, growing splendid timber on clay or other substantial moist soil. The common British Oak is Q. Robur, and there are two forms, one with stalked and the other with stalkless acorn cups; the former, called pedunculata, is classed as a separate species by some botanists, and there are several good garden varieties of it, notably fastigiata, columnar; heterophylla, much-divided leaves; and pendula, drooping. There are several varieties of the stalkless form, sessiliflora. Cerris, the Turkey Oak, is a popular tree, and has several forms, such as laciniata, much cut; Lucombeana, which holds its leaves very late; and variegata. Ilex is the Holly, Holm, or Evergreen Oak, and it also has several varieties. Mirbeckii is a handsome Oak with large toothed leaves. Coccinea is the Scarlet Oak and the form Knap Hill Scarlet is one of the best garden Oaks, as its leaves colour richly and hang right through the autumn. Suber is the Cork Oak; its bark is the cork of commerce. Other species are Phellos, the Willow Oak; Prinus, the Chestnut Oak; rubra, the Red Oak, with its yellow-leaved for maurea; conferta (Pannonica), the Hungarian Oak; palustris, the Marsh Oak; and macrocarpa, the Burr Oak. Acuta and serrata are small Japanese evergreen species.

Quick. Young plants of Crataegus Oxyacantha are called Quick when grown for hedges. See Hedges.

Quince (Pyrus Cydonia or Cydonia vulgaris). The Pear-shaped Quince is a highly aromatic fruit, colouring bright yellow when ripe, and useful for jelly. The tree is of rather straggly habit. The Quince will thrive in well-drained loamy soil, and is at its best near water. The best Quince for Pear stocks is that known as the Angers, which has supplanted the Portugal Quince. Stools are planted, shortened hard the first year, and the upspringing shoots which follow earthed up progressively. At the end of the growing season they are detached and planted out; they are ready for budding the second year. See also Pears. There are several ornamental Quinces, and one, japonica, the Japanese Quince, is much planted as a shrub for walls on account of the profusion of large and brilliant flowers with which it clothes

itself in spring. Maulei is also fine. The fruit of the Japanese Quince is curious in shape and colour, but of no value.

Quincunx. Planting by the Quincunx method, common with large fruit-growers, is making a set of 5 trees of which 4 form a square and a fifth occupies the centre of the square. What may be termed "opposite vacancy" planting is often called quincunx, but it is not the same, the lines of trees being at an angle of about 57°, and the trees farther apart diagonally than vertically.

R

Rabbits. These animals often do much damage in gardens. Galvanised-wire netting 3 ft. high and of 1¼-in. mesh, the bottom slightly embedded and turned outward, is the most satisfactory deterrent. To prevent trees being barked in frosty weather, brush on either a coat of soot and skim milk or a paste of cow manure with enough tar to make it sticky.

Raceme. An inflorescence in which each flower on its own unbranched stalk grows on a central stalk.

Radicle. The first root of a plant. The part just behind the apex extends fastest and produces fibres freely.

Radish, Raphanus sativus (răph-anus. Ord. Cruciferæ). The Radish presses the Lettuce hard for popularity as a salad and "relish." All classes appreciate it, and it is a "stock line" with market gardeners. It is a fairly hardy vegetable, and those who value a long supply sow in autumn as well as in spring. The first sowing of the year may be made in a sheltered place towards the end of February, in well dug and manured soil, the seed being sown broadcast 1 in. deep, and the bed covered with tanned netting or black thread in order to keep off birds. Thereafter sowings may be made at intervals until September. Those who force vegetables in frames (see also French Gardening) frequently sprinkle a few Carrot and Radish seeds in mixture in rows, drawing the Radishes before the Carrots want much room; or they sow between frame Potatoes. The following varieties are good if drawn young: Turnip (red and white), French Breakfast, Wood's Frame, Long Scarlet. For forcing, Earliest of All or Extra Early Forcing Turnip. The Black Spanish and China Rose are good for winter use. See also seedsmen's specialities.

Raffia. See Raphia.

Ragged Robin. See Lychnis Flos-cuculi.

Ragweed. See Senecio.

Rainbow Flower. See Iris.

Rake. Iron rakes of various sizes are useful in reducing lumpy soil to a fine state suitable for sowing, and removing stones. A 10-in. is a useful size. Rakes should be mounted on Ash handles. A wooden rake with a 2-ft. head is useful for raking up leaves in autumn, and incidentally for breaking down heavy soil in spring when the wet lumps resist the smaller iron rake. See also remarks under Digging and Tilth.

Ramondia (ră-mŏnd-ia. Ord. Gesneraceæ). Pretty hardy perennial alpines, suitable for the rockery or selected nooks in the border. Pyrenaica, which grows about 6 ins. high, and bears violet flowers in summer, is the best known; there is a white variety, alba, and also a dark, purpurea. Serbica Nathaliae, with violet flowers, resembles

pyrenaica. They like peat and loam in equal parts, with grit. Propagation is by seed in a greenhouse or frame in spring, or by division of old, well-established plants.

Rampion (Campanula Rapunculus). The roots of Rampion are used for winter salads, the seed being sown in spring, say in April and May, to provide successions, the later sowings giving roots throughout the winter. It likes a rather shady place with abundance of moisture.

Rampion, Horned. See Phyteuma.

Ranunculus, Crowfoot (rā-nŭn-culus. Ord. Ranunculaceæ). A large genus, varying greatly in habit and duration. Acris is the common Buttercup. Bulbosus is the Crowfoot, a troublesome garden weed with great tenacity of life, best extirpated by uprooting it while the soil is moist and the sun hot. Ficaria is the Lesser Celandine. The following are good garden species and varieties suitable for borders in rockeries: Aconitifolius, white, 2 ft.; the double form plenus (Fair Maids of France) has white flowers in late spring, height about 18 ins.; amplexicaulis, white, spring, 9 ins.; grandiflorus is a large form; anemonoides, pink and white, 6 ins., moist rockery; Lyalli, white, spring, 2 to 3 ft.; montanus, yellow, 6 ins., and parnassiaefolius, white, 6 ins. Asiaticus has given us the florists' Ranunculus, which has lost some of its old-time favour, and is rarely bedded by florists as was once the case. The flowers are symmetrical and brilliantly coloured, but rather stiff. The Turban class are early bloomers, and may be planted 2 ins. deep and 1 ft. apart, claws downward, in autumn; the French and Persian, which bloom later, may be planted in February or March. They all like a sandy, friable, well-drained soil.

Rape (Brassica Napus). Often sown to accompany Cress as a substitute for Mustard, and may be treated like the latter. Rape dust, the refuse of the seed, may be dressed into ground infested with wireworm. Rape is often mixed with Mustard as a green manure; see Mustard.

Raphanus sativus. See Radish.

Raphia. A cheap, strong, and flexible tying material, sold by florists under the name of raffia, is prepared from the palm, Raphia pedunculata. It is sold, plain and coloured, by most florists.

Raphiolepis, Indian Hawthorn (răph-i-ō-lĕp-is. Ord. Rosaceæ). A small genus of semi-hardy evergreen shrubs, of which japonica (ovata), with sweet white flowers in early summer, height 2–3 ft., is the best known. It will succeed outdoors, with shelter and a compost of sandy loam and peat, in the milder parts of Great Britain. Propagation is by cuttings inserted in sandy loam under a hand-light in summer. Plant in spring.

Raspberry (Rubus Idaeus. Ord. Rosaceæ). The Raspberry is an esteemed fruit, alike for cooking and preserving. One would grow Raspberries if it were only for the sake of their supplementary value for Currant, Loganberry, Strawberry, and other stews and jams. What soft fruit is not improved by Raspberries? If a little insipid by themselves, they certainly form a perfect corrective of the acidity of red Currants and the sharpness of Loganberries. Of their importance for preserving, one need say nothing.

Fortunately it can be grown successfully in all but the poorest soils. It does not, however, like dry, hot ground. Its nature is to spread at the root by underground suckers near the surface, and to

throw up long, slender shoots bearing leaves; these shoots produce small fruiting clusters the following year—sometimes the same year, but that is not desirable except where late fruit is wanted. It is apparent that the way to get heavy crops of Raspberries is to manage them so as to secure an annual succession of good fruiting canes. There is no difficulty about this.

Propagating and Planting. If young suckers are taken from the old stools in autumn, planted in deeply tilled, well-manured soil, either 1 ft. apart in a row to be tied to a horizontal wire 3 or 4 ft. high, or in clusters of 3 or 5 to form a clump and be supported by a strong stake, and are then cut back to within 6 ins. of the ground, they will quickly become established. Root cuttings are sometimes used, especially with varieties which sucker slowly, such as Pyne's Royal.

Pruning. The fruiting shoots of the one year may be pruned away after bearing, and give place to the young shoots which will be the fruiters of the following year. The annual digging should be shallow. Top dressings of manure will sustain vigour and fruitfulness.

Varieties. The weaker sorts, such as Carter's Prolific and Maclaren's Prolific, do not care for very stiff soils; but strong varieties like Norwich Wonder, Baumforth's Seedling (Bountiful), Northumberland Fillbasket, and Perfection (Abundance) will succeed on heavy land. The popular variety Superlative, one of the best for vigour and size of fruit on medium soil, is somewhat impatient of very stiff and also shallow limestone soils. Hornet and Profusion are two other fine Raspberries for medium soils. The autumn-fruiting section, of which October Red, Perpetual de Billard, Hailshamberry, and Yellow Antwerp are good examples, are useful in their season. These are pruned back in spring and the young wood which follows bears in autumn. If a variety is wanted specially for preserving, Semper Fidelis might be grown, as it is both firm and acid. Fastolf also makes good jam. Pyne's Royal is a splendid garden variety for flavour and preserving, but makes few canes. Lloyd George, on the contrary, is exceptionally vigorous and does particularly well on heavy land. It can be used as an autumn fruiter.

Enemies. The commonest and worst of the pests attacking Raspberries and Loganberries is the Raspberry beetle (Byturus), the larvae of which, hatching from eggs laid by the beetle on the flowers in May, eat into the fruit. The best remedy is to shake the canes above tarred boards or greased pans in May, so as to dislodge the beetles. When the grubs have got into the fruit, nothing can be done except to pick off the affected berries by hand, and that is a tedious process. Unfortunately, most people do not think of the pest in May, but only realise its existence when mischief has actually been done. A few canes here and there ought to be examined in May in order to see whether the enemy is at work. The Raspberry weevil (Otiorhynchus) may also cause trouble; the tarred board remedy is the best.

Rats. These animals often ravage stored crops. The holes should be found, 2 tablespoonfuls of calcium cyanide placed in, and the holes trodden in. Being poisonous, the cyanide should be used with care.

Rat's-tail Cactus. See Cactus (Cereus flagelliformis).

Red Cedar. See Juniperus Virginiana.

Red-hot Poker. See Kniphofia.

Red Spider. Tetranychus telarius is one of the most troublesome of plant enemies, attacking both indoor and outdoor crops. It is really a sucking mite, not a true spider, although it spins a web on the under side of the leaves. When the leaves of Grape Vines, Peaches, Cucumbers, Scarlet Runners, and many other plants turn bronzy or yellow before the natural period of decay, red spider may be suspected. A dry atmosphere encourages it, a moist one is inimical to it. Frequent syringing is a preventive. In case of emergency, syringe with hot water in which soft soap at the rate of 1 lb. per gallon and sulphur 1 handful per gallon have been stirred; or dust with flowers of sulphur; or spray with ¾ oz. nicotine extract, 1 lb. soft soap and 10 gallons water, first boiling the soft soap in 1 gallon of water.

Reed, Great. See Arundo.

Reed Mace. See Typha.

Rehmannia (rēh-mann-ia. Ord. Scrophularineæ). Handsome herbaceous perennials, nearly hardy, but best grown in a cool house. Sandy peat forms a suitable soil. Propagation is by cuttings in spring, or by seeds sown in a frame or greenhouse in spring. Seedsmen offer angulata, purple, 2 ft. high or more, and the variety Pink Perfection. Chinensis (glutinosa), and Briscoei, 6 ins., cream and pink, a hybrid, are also met with.

Renanthera (rē-năn-thera. Ord. Orchidaceæ). A small genus of Orchids. Coccinea grows 4 to 5 ft. high, and has red flowers in August. It looks well trained against a fern stump in a hothouse, also in a basket. Imschootiana has red and yellow flowers, and is also a good basket plant. They thrive in peat and Sphagnum moss, with sand and charcoal, and may be increased by cuttings in a propagating case.

Reseda, Mignonette (rĕs-e-da. Ord. Resedaceæ). The principal species is odorata, see Mignonette and Annuals. Alba is a biennial with white flowers, 2 ft. high, a good border plant, and easily grown from seed sown outdoors in May. Frutescens is a shrubby form of odorata, and is sometimes grown in pots.

Rest Harrow. See Ononis.

Retinospora or **Retinispora** (rĕtin-ŏs-pora. Ord. Coniferæ). Handsome small Conifers, resembling Cupressus (Cypresses) and amenable to the same culture as respects soil, propagation, etc., in fact they are classed together by modern botanists. Erecta, ericoides, filifera, leptoclada, lycopodioides, obtusa, o. densa aurea, o. alba spica, pisifera, p. aurea, plumosa, p. aurea, p. argentea, squarrosa, and other species and varieties are offered by nurserymen under the name of Retinospora.

Rhamnus, Buckthorn (rhăm-nus. Ord. Rhamneæ). A large genus, of which only a few species and varieties need be considered. Alaternus, which grows 15 to 20 ft. high, and has green flowers in spring, is the best known; angustifolius, a. variegatus and aureus are forms of it. Catharticus, 6 to 8 ft., has green flowers in summer, followed by black fruit. Frangula (latifolius), the Black Dogwood, also has black fruit. Libanoticus colours well in autumn. They are all hardy, and not particular as to soil. Propagation is by seed and layers.

Rhapis (rhā-pis. Ord. Palmæ). The species flabelliformis is a useful

fan-leaved palm, suitable for rooms and corridors; there is a variegated-leaved variety. For culture, see Palms.

Rheum, Rhubarb (rhē-ŭm. Ord. Polygonaceæ). Some of the Rheums are useful for prominent positions in the wild garden, as the leaves are broad and massive. Palmatum and its variety purpureum are particularly good. They are hardy, and thrive in ordinary soil. Propagation is by division in spring. Rhaponticum is the common Rhubarb, which see.

Rhipsalis, Mistletoe Cactus (rhĭp-să-lis. Ord. Cacteæ). See Cactus.

Rhizome. A prostrate, partly underground stem, bearing both roots and shoot-buds, as in many Irises.

Rhodanthe (rhō-dăn-thē. Ord. Compositæ). Pretty half-hardy annual everlastings. Manglesi, with rosy flowers in summer, grows about 1 ft. high. Botanists now call it Helipterum Manglesii. For culture, see Helipterum and Annuals (half-hardy). Maculata and its white variety are also offered by seedsmen. The Double Rose Rhodanthe is liked by many.

Rhodochiton (rhō-dō-kī-ton. Ord. Scrophularineæ). The species volubile is a handsome greenhouse climber, with red flowers in early summer. Lophospermum atrosanguineum is the same thing. Loam, with sand and a third of leafmould, suits it. Propagation is by seeds in a greenhouse in spring, or by cuttings in sandy soil under a bell-glass in August.

Rhododendron (rhō-dō-dĕn-dron. Ord. Ericaceæ). This magnificent shrub remains, and is likely to remain, the Queen of evergreens. Handsome in foliage, shapely in habit, hardy, suitable for cultivation on most soils, and flowering gloriously in late spring and early summer, it is entirely beyond compare. There is a natural desire on the part of every flower lover to grow Rhododendrons, and there is but one class actually debarred from growing most of the best species and varieties, namely, those who garden on chalk or limestone, which most Rhododendrons abhor. Even these may succeed, at all events for several years, by importing loam and leafmould or peat, to be substituted for the chalk in prepared stations; and it is for each Rhododendron lover to weigh the cost. The only other serious reservation concerns space. Rhododendrons need a good deal of room to do themselves justice, and the owner of a small garden cannot grow a large collection; he must restrict himself to a few plants. From this point of view, one is glad to realise how beautiful an object one well-grown Rhododendron can be; and how unnecessary mass cultivation is for success and pleasure to be gained.

Pruning. The Rhododendron is naturally a compact grower, and as such calls for little pruning. It is the mass-grown crowded bushes which get unsymmetrical and call for pruning. This, it may be said, can be carried out severely with old gawky plants, for the pruner may cut low into old thick wood, from which new shoots will break.

Varieties. If only a few can be grown they must, of course, be good, and there are none finer in their colours than the splendid pink, Pink Pearl, the deeper pink Alice, the rose Lady C. Mitford, the crimson John Waterer, the purple Melton, the white Baron Schröder, the carmine Lord Palmerston, the bicolor Sappho, the blush Gill's Goliath, and the blood-red Cornubia. The old variety Cunningham's White is the most likely to succeed on limestone. Space does not

admit of describing species, although many are beautiful, notably Thompsoni, with red Lapageria-like flowers in clusters.

Positions. While Rhododendrons are hardy, and are often grown in beds on large lawns, which are windswept at certain periods of the year, they give of their best when sheltered from cutting winds; thus, a draughty site is not favourable. Individual plants are also likely to suffer from exposure because, the roots being thin and near the surface, they do not get well anchored, and are liable to be blown over and bent by snow. Another point is that the flowers remain the longer in beauty for semi-shade. Thus, while one would not generally plant them directly below trees, one would try to choose a site to which a belt or group of trees gives shelter and also shade during the hottest part of the day. The old species ponticum is planted in woodland.

Propagation. It is a matter of some interest that the Rhododendron has an ally in a root fungus which takes in moisture like root hairs. Humus is therefore necessary for cuttings, which should be made of young shoots inserted in sandy peat in summer; but layering is better on the whole. Large growers pursue grafting, with ponticum and Cunningham's White as stocks.

Fresh and Fading Flowers. There are few growers of Rhododendrons who will want to gather many of the flower-trusses for the house, because they look far better on the plants; those who do must abstain from cutting with long pieces of wood, for the growth buds nestle at the base of the flower-trusses. For this reason, too, fading flowers should be removed with care; they should be pinched off without injury to the basal buds referred to, which will give new flowering shoots. The removal of the fading flowers is naturally a preventive of seed-formation, and to that extent encourages growth.

Planting. Early autumn is a good season for planting, failing that, spring. Young plants with the buds set and prominent will shift quite well in showery weather in April, with proper care and attention. Reassuring remarks as to soil should not lead growers to suppose that Rhododendrons do not respond to special efforts, such as deep digging (see Bastard-trenching), and additions of manure (if possible also turfy loam) to poor soil. Peat and leafmould will improve very stiff ground.

Rhodora canadensis. This is the botanist's Rhododendron Rhodora, a deciduous shrub with rosy-purple fragrant flowers, like small Honeysuckles, in early spring. Height 2 to 4 ft. It likes cool moist soil in partial shade.

Rhodotypos (rhō-dō-tŷp-os. Ord. Rosaceæ). The one species, kerrioides, is a deciduous Japanese shrub with toothed leaves and white flowers in spring; height 8–12 ft. It may be grown either as a bush or against a wall in any good garden soil. Propagation is most easily effected by division in autumn or spring. Plant in spring.

Rhubarb (Rheum rhaponticum). A good stool of Rhubarb is very serviceable, and those who have the necessary accommodation may grow several, and force a portion, either by placing some litter or a bottomless box or barrel round the roots in the garden, or by lifting a few stools, packing them together in soil in a warm place, and watering them. Thus a succession will be secured, as the unforced plants will come on later. Forcing may be done in pits or frames,

either with a mild hotbed or with gentle heat from hot-water pipes. The roots may be set in a bed of good soil and covered a few inches deep. A temperature of 50° to 60° and a supply of tepid water as needed will bring the produce on well in advance of that outdoors. In starting with Rhubarb, seed may be used and sown in spring, the plants being shifted the following spring; but of the older sorts sticks cannot be pulled under 3 years. Roots may, however, be bought, and if planted in good soil in spring will yield the following year; it is not wise to pull from freshly established plants. Afterwards the stock may be increased by division. A cool, moist site should be chosen for this crop, and the soil should be manured liberally. Soakings of water, liquid manure, house slops, and soapsuds will strengthen it. Champagne (early), Early Albert (medium), and Victoria (late), are 3 good varieties. Glaskin's Perpetual will give small sticks from seed within a year if sown in boxes in March and planted in good soil in May.

Rhus, Sumach (rhŭs. Ord. Anacardiaceæ). A useful and singular genus. Cotinus, a hardy shrub 6 to 7 ft. high, with light purple flowers in early summer, is the popular Smoke Plant; the variety atropurpurea has dark leaves, and pendula is of drooping habit. Toxicodendron is the Poison Ivy, a hardy climber with greenish-yellow flowers in early summer, contact with whose leaves causes painful sores on the skin. Typhina, a hardy tree with greenish-yellow flowers in early summer, is the Stag's-horn Sumach. They will grow in almost any soil, and are propagated by cuttings and layers.

Ribbon Fern. See Pteris serrulata.

Ribes, Currant, Gooseberry (rī-bēs. Ord. Saxifrageæ). A useful genus. Grossularia is the Gooseberry, nigrum the Black Currant, and rubrum the Red Currant; album, the White Currant, is a variety of the latter. See Gooseberry and Currant. Of the ornamental species, aureum, with yellow flowers, followed by yellow fruit; and sanguineum, with rosy flowers in spring, are the most important. There are several varieties of both. They will grow in almost any soil, including chalk, and are among the earliest of shrubs to bloom. Sanguineum has a very strong Currant smell. Propagation is by cuttings in summer. Among modern species may be mentioned Giraldii, pendulous habit, greenish flowers; and laurifolium, an evergreen with yellowish-green flowers.

Richardia, Arum Lily (rĭch-ār-dia. Ord. Aroideæ). Africana (aethiopica) is the familiar Arum Lily. There are several varieties, of which Godfrey's, although small, is one of the best, as it is such a free bloomer. Elliottiana and Pentlandii have yellow flowers. They are beautiful plants for the greenhouse. See Arum Lily.

Ricinus, Castor-oil Plant (rĭc-ĭn-us. Ord. Euphorbiaceæ). Handsome foliage plants, used in sub-tropical gardening for their large, handsome leaves. They are all varieties of communis. Gibsoni, with purplish leaves; and G. atrosanguineus, with crimson leaves, are two of the best. Castor oil is obtained from the seed of the species. They are best treated as half-hardy annuals, being sown under glass in February and hardened in a frame before being planted out in May. They like a deep, fertile soil.

Ridging. The process of throwing up stiff, heavy soil in parallel ridges

in autumn or winter in order to let frost act on it. In districts where frost can generally be relied upon it is admirable, as the coarse lumps are pulverised naturally.

Ringing. An old garden practice, consisting in removing a ring of bark from a branch. It is sometimes done with plants which are to be layered, before pegging the branches into the soil, and sometimes also with fruit trees just before the blossom opens in order to check the sap and promote fruitfulness, the descending current of food forming a callus.

Rivina (rī-vī-na. Ord. Phytolaccaceæ). The species humilis is a handsome hothouse evergreen, growing about 2 ft. high, with white flowers in early summer, followed by red berries, which hang a long time if the plants are kept in a cool, airy structure. Loam, with sand and a little leafmould, suits. Propagation is by seeds in heat in spring, and by cuttings.

Robinia, Locust Tree (rō-bĭn-ia. Ord. Leguminosæ). Handsome hardy trees and shrubs, with pretty feathery leaves and Pea-like flowers in bunches. Hispida, the Rose Acacia, is a beautiful tree, 5 to 6 ft. high, with rosy flowers in spring; and inermis, which is a spineless variety of it, is still better. Neo-mexicana makes a handsome tree 15 to 30 ft. high, with rosy flowers in autumn. Pseud-acacia, the False or Bastard Acacia, is the common Locust; it has white flowers in spring, and is a good street tree; angustifolia, aurea, Bessoniana, and robusta Vignei are varieties of it. The Robinias thrive in most soils, if not stiff and damp. Propagation is by seeds and grafting, but is best done in the nurseries.

Rochea (rō-chea. Ord. Crassulaceæ). Handsome evergreen succulents, allied to Crassulas, and grown in the same way (see Crassula). Coccinea, 1 ft. high, with scarlet flowers in summer; falcata (Crassula falcata); and jasminea, 9 ins., with white flowers in spring, are the principal species.

Rock Broom. See Genista.

Rock Cress. See Arabis.

Rock Cress, Purple. See Aubrietia.

Rockeries. It is almost impossible to describe the best plan of building rockwork for any particular type of garden, as a good deal depends not only on the configuration of the ground but on the nature of the stone; however, a few hints may be of service. (1) A sunny position should be chosen, as Alpine plants are accustomed to unrestricted light. (2) If the ground is variable in contour its outline may be utilised to form natural mounds and dells; if level, the outline may be broken by forming mounds with the larger stones. (3) The rock garden should not run in a straight line, but should advance and recede, so that bay succeeds promontory. (4) The body of the rockery should consist of soil rather than of stones, because the plants will not thrive under the conditions which they have to face unless they have abundance of good soil for rooting in. (5) The rock garden looks well if formed in irregular masses on both sides of a winding path, which should itself consist of stones, large, flat pieces being chosen, and dwarf plants put in crevices between them. (6) Given such a path, the rockery might be carried up on either side of it in low, flat terraces, each 3 or 4 ft. wide, and rising above the one below it at a height of about 1 ft.

This style of rockery building has several advantages: (*a*) small stones may be used, (*b*) if a mistake is made it can be rectified without the laborious shifting of large masses of rock. (7) An effect of height can be got in a small compass so long as everything is kept in proper proportions. Any trees and shrubs which are used on a small rockery must be small themselves, or the proportion will be lost. (8) When stones, whether large or small, are put in a sloping mound or bank of soil, care should be taken to set them in such a way that the rain and water supplies may fall inwards instead of outwards—in other words, the stones should deflect the moisture towards the plants, not away from them.

Soil for Rock Plants. In making up the body of a rock garden with soil it is generally convenient to draw from soil in the neighbourhood, but while this may be good enough to form the nucleus, it may not be suitable for actual contact with the plants, either on account of its being heavy and damp, or because it is very poor and fibreless. The difficulty can be got over by importing a few loads of special soil for surfacing, and especially for the " pockets " among the stones in which the plants are placed. Here a mixture of good fibrous loam and limestone grit will be very helpful. The great majority of Alpines love a ring of chippings around them.

Planting Rock Plants. The rockery maker should have before him the desirability of getting the stones well covered as quickly as possible, and to this end should use carpeting plants freely. Places may be provided for broad patches of these. But it is well to guard against their encroaching on the pockets of weaker things and smothering the latter. Arabises, Aubrietias, Cerastiums, Alyssum saxatile, Iberises (perennial Candytufts) and many of the Saxifrages are beautiful plants, and very useful for covering the surface of the soil quickly; but they must be kept within bounds. Alpines may be planted at almost any period of the year, as dealers keep the best kinds in pots; but planting from the ground may be done any time between autumn and spring when the ground is workable.

Slugs. These creatures are a source of considerable trouble to the rock gardener, and it will be found that they are the most abundant where a good deal of moist cover is provided by coarse plants. The repression of exuberant growth, and a periodical dusting with freshly-slaked lime, will keep them under.

Winter Protection of Rock Plants. Alpines will endure a great deal of cold, but those with woolly leaves are apt to suffer severely from wet, and consequently it is wise to set small squares of glass above choice kinds in order to throw off the rain. Plenty of chippings round the plants will also serve as a preventive of loss from damp.

For other remarks and for selections of plants see Alpine Gardens and Plants.

Rocket. The Double yellow Rocket is Barbarea vulgaris flore pleno, of which the variegated form is sometimes grown for the rockery. The Sweet Rocket is Hesperis matronalis, a hardy perennial. There are both purple and white forms, flowering in spring. They are easily grown from seed in ordinary soil.

Rockfoil. See Saxifraga.

Rock Jasmine. See Androsace.

Rock Rose. See Cistus.

Rodgersia (rŏdgĕr-sia. Ord. Saxifrageæ). A small genus of hardy herbaceous plants, only one of which, podophylla, which grows 2 to 3 ft. high, and has small yellowish flowers in summer, is grown to any extent. It forms fleshy underground stems. It likes a moist, peaty spot. Propagation is by division in spring. Aesculifolia, cream flowers and bronzy foliage; pinnata, rose flowers, and red foliage in autumn, with white variety; and sambucifolia, cream, are modern species of interest.

Roller. A roller is almost indispensable in the garden. To begin with, there are probably paths to consider. Then there is likely to be turf. Both benefit greatly by rolling at proper times. Even experts differ as to the most suitable weights for rollers. For the general purposes of a small garden, a roller 18 ins. by 18 ins., weighing about 2¼ cwt., will suffice. The Double Cylinder Water Ballast type is now in favour, and for a medium-weight roller of that class, one weighing say 5¼ cwt. empty and 8 cwt. full would be suitable; this is the heaviest that can be used by one man, indeed help with it is advisable. For a heavy roller, suitable for grass on light soils, the cylinder diameter may be 27 ins., and the total width 54 ins. A Double Cylinder Water Ballast roller of this type would weigh about 15¼ cwt. empty and 22 cwt. full, exclusive of seat and man. Alternatively, it could be 36 ins. by 36 ins., weighing about 16 cwt. empty and 25 cwt. full, with seat. In either case, a horse or motor power would be required. There are now combined mowers and rollers, with motor power, on the market, suitable for extensive areas, such as municipal and school lawns and playing-fields. In addition to all-metal rollers, a type with combined metal and concrete is available, and is a little lower in cost.

Romneya Coulteri, Californian Tree Poppy (rŏm-nĕy-a. Ord. Papaveraceæ). A beautiful small Californian tree, growing 3 to 6 ft. high, and with large white flowers in summer. It likes a well-drained loamy soil, and a sheltered spot where it will not be worried by strong winds. Propagation is by seeds sown in a greenhouse or heated frame in spring, the seedlings being hardened in a frame before being put out. R. trichocalyx is very similar to Coulteri.

Rondeletia (rŏn-dĕl-ē-tia. Ord. Rubiaceæ). A small genus of hothouse evergreens, only one of which, odorata (speciosa), which grows 3 to 4 ft. high, and bears fragrant scarlet flowers in late summer, is much grown. It likes equal parts of peat and loam, with sand, and may be propagated by cuttings in a warm house under a bell-glass in summer. Cut hard back after flowering.

Room Plants. With care in watering (see Watering), and ventilation in such a way as to provide fresh air without a cutting draught, many plants may be grown successfully in rooms, including Aralias, Aspidistras, Ferns, Ficus (India-rubber Plant), and palms (see Palms), among foliage plants; and Chrysanthemums, Cinerarias, Clivias, Cytisus, Francoa ramosa, Fuchsias, Zonal Geraniums, Primulas, and various bulbs among flowering plants. All these plants are dealt with under their own names. The fear of injury from plants in sick-rooms is not well based, but such apartments should always be well ventilated, both for the benefit of patient and plant. Strong-smelling flowers should be avoided. Naked gas-burners are bad for plants, but incandescent burners cause little injury. Sheets

of newspaper may be spread over the plants on cold nights. In most cases it is an excellent plan to stand room plants out of doors for short spells during mild showers of rain. Foliage plants may be sponged weekly.

Roscoea (rŏs-cō-e-a. Ord. Scitaminæ). Herbaceous perennials, mostly tender, but several species may be grown in sheltered places outdoors, notably cautilioides, yellow flowers in summer, 1 ft. high; and purpurea, purple, 9 ins., summer. Sandy loam and peat suit. Propagation is by division in spring.

ROSES: CULTIVATION AND SELECTIONS

The genus Rosa (Ord. Rosaceæ) is an immense one, giving as it does, in addition to numerous species, the beautiful Hardy Perpetual, Tea, Hybrid Tea, Pernetiana and other Roses of our flower-beds, the climbers we use for walls, arbours, pillars, and pergolas, and a considerable number of beautiful species.

Species. It may be of interest to refer at the outset to a few of the species, many of which are grown in one garden or another. Banksiae is the white Banksian Rose; there is a yellow form, lutea; these are pretty wall Roses, which must only be pruned to the extent of thinning out some of the oldest wood, as they flower on shoots of two years old or more. Bracteata is the Macartney Rose, a dwarf species with white flowers. Canina is the Dog Rose of the hedges. Centifolia is the Cabbage Rose, of which there are many varieties, including muscosa, the moss Rose; and there are several garden forms of the latter. Damascena is the Damask Rose, which is certainly one of the parents of our modern H.P.'s; the variety versicolor has red and white flowers, and is called Gloria Mundi. Gallica provincialis is the Provence Rose. Indica is the China or Monthly Rose, and its variety odorata is one of the parents of our modern Tea Roses. Sinica (laevigata) is the white Cherokee Rose. Lutea (Eglanteria), a dwarf yellow species, is the Austrian Brier. This species, through its form the Persian Yellow crossed with garden varieties, has given an entirely new and highly important race—the Pernetiana. Austrian Copper and Harrisoni are two other forms of lutea. Moschata (Brunonii) is the Musk Rose. Multiflora (polyantha) is the parent of many of our modern climbing Roses. Repens (arvensis) capreolata is the Ayrshire Rose. Rubiginosa is the Eglantine or Sweetbrier. Pomifera is the British Apple Rose. Rugosa is the Japanese Rose. Sempervirens is the Evergreen Rose. Setigera is the Prairie Rose. Spinosissima (pimpinellifolia) is the Burnet or Scotch Rose. Wichuraiana (Luciae) is one of the parents of many modern beautiful climbers, such as Dorothy Perkins, Lady Gay, and Alberic Barbier. The so-called "Alpine Rose" is not a Rosa but a Rhododendron (hirsutum). Bourbon Roses are hybrids of Indica. Noisette Roses are hybrids of Tea and Musk Roses. The "Fairy Roses" of seedsmen are dwarf multiflora varieties which will flower from seed in a few months if sown in heat in winter and the seedlings hardened in a frame.

Among modern species special note should be made of Moyesi, for the large red flowers are followed by very beautiful red hips. Helenae, white flowers and yellowish-red fruits, is good. Willmottiae, with carmine flavours, is distinguished by its brown stems.

Rose Gardens. The flower garden must have Roses, unless it is so near a town that the Queen of Flowers refuses to thrive. In large places a special garden may be made for Roses, but more often they are spread over the garden: Roses in the bed here, Roses on the arch yonder, standards in this border, Ramblers on that summer-house, a Rose on the house wall, a group pegged down in a lawn bed. Only one grower here and there plans for Roses, the rest just plant them. It is well that Roses should be grown in many parts of the garden, so that their beauty and fragrance may be met with everywhere; we can hardly have too many. And there is this particular advantage in spreading the Roses over the garden—there is no serious want of colour when the majority of them are out of bloom, because other things near them are in flower. In a Rose garden proper one looks for a great panorama in early summer and merely sporadic flowering for the remainder of the year. But the joy, the beauty, the glory of the season are something that remain a tremendous and moving memory, giving happiness for many months. The Rose garden gives opportunities to many Roses which are not capable of producing flowers of special individual merit, but which by their good habit, fine colour, and freedom of flowering have particular qualities as plants. Planted together in a bed, they produce a beautiful effect. Unless a Yew hedge is preferred (and it certainly looks well) the Rose may form its own enclosure, as it is well capable of doing in its stronger forms. The boundary may be a Sweetbrier hedge, or a rustic framing enmeshed with Dorothy Perkins, Alberic Barbier, and other hardy, vigorous, free-blooming varieties which form a thicket of foliage and blossom. Again, it may be an elaborate series of wire frames connected with arches, or merely a line of old rope on which Roses trail. The garden may be circular, or it may take any particular form which the taste of the grower dictates. A garden planned so that the paths converge on a central area is admirable. A seat, a pool, a sundial—perhaps all three—can be provided at the garden's heart and from this favoured spot the whole of the garden can be seen and enjoyed. The paths should be of grass or, if grass surrounds the beds, of stone flags or crazy paving.

Site. The site for the Rose garden must be considered with care. It should not be overhung with trees, otherwise it will be damp and the plants will be " drawn," moreover, overhanging means a nearness which suggests encroachments of greedy tree roots on the food meant for the Roses. A certain amount of shelter is desirable, none the less, if the district is a cold one, or there is exposure to strong winds. And the grower may sometimes be able to scheme to get shade for a part of the garden during the burning noon hours, to the benefit of particular varieties which lose their colour in fierce heat and to the increase of his own comfort. He can, perhaps, contrive to utilise a Copper Beech as background for a flaming pillar of Madame René André or Carmine Pillar, or a Prunus Pissardii as a foil for an arch of Blush Rambler. It is in arrangements such as these that the individuality of the gardener asserts itself.

Soil. A bottom on clay, so bad for most crops, is good for Roses if not heavily shaded. They are not so impatient as fruit trees, for example, of a wet subsoil. The one serious drawback to such a site is mildew, but that, to be sure, contrives to flourish under most

conditions if left alone. It must be fought, together with Orange Fungus and other fungoid pests of the Rose garden. Let us remember, however, in connection with this question of soil, that while Roses unquestionably enjoy clay, they will flourish on any ordinary soil provided vigorous varieties are selected, plenty of manure is used, and deep cultivation is practised. What the kitchen gardener will do for Peas and Onions the Rose lover will assuredly do for Roses.

Beds and Paths. A simple arrangement of beds is better than an intricate one. Such arrangements of circles and crescents and stars as one sometimes sees on lawns are not suited to Roses. A group of oblongs side by side, narrowing towards the base, with a large circular bed in the centre, are appropriate. Or the garden may be planned similarly to the kitchen garden: an outer border with circumferential path all round the garden, and two central intersecting paths dividing the garden into four quarters. There may be pillars or rope at the back of the borders, which can be planted in part with dwarf Roses, such as Chinas and dwarf Polyanthas. There may be an arch at the entrance to the garden and inner arches at each point where the circumferential and central paths meet. There may be an object of interest in the middle of the garden as already mentioned. It might be a summer-house, but a good place for this would be the north-east corner, so that the aspect was south-west; this would command the whole of the garden, bathed in sunlight. The centre could then be devoted to a bold group of pillars or some other conspicuous object.

Weeping Standards. The planting of the quarters would afford much scope for taste and ingenuity. An admirable plan of treating the principal area of each would be to put it down to grass and dot it with weeping standards, using such varieties as Wichuraiana rubra, Dorothy Perkins, Hiawatha, Excelsa, Lady Godiva, and Shower of Gold. These are beautiful objects when well grown and they would produce a much richer and more dignified effect than a cluster of small fancy beds. The beds would be disposed beside the paths, the corners of which would be rounded in order to " legalise " oval and round beds, which would alternate. The ovals could be planted with vigorous Hybrid Perpetuals and Hybrid Teas, the rounds with pegged-down plants, Teas, and Chinas. If it was desired to make use of ordinary standards, they could be planted on that part of the outer border immediately to left and right of the principal entrance.

There need be no intermixture of varieties in the beds of the Rose garden; but if different varieties are put together, they must be sorts the colours of which blend and the flowers of which are at their best about the same time. Those who make Rose gardens generally like to restrict each bed to one variety.

A Rose garden may be made on a large or a small scale with equal effect. It is not in large places alone that Rose gardens, with all their charms and joys, can be brought into existence. The villa could have its Rose garden as well as the palace.

The confirmed Rose lover will not repine if the Rose garden is not full of bloom every month in the year. At periods when there are no flowers the cultural operations, pruning and training, spraying

and feeding, will keep his interest alive—these, combined with the never-failing stimuli of memory and anticipation, which of themselves bridge the period between one flowering season and the next. However, the blossoming season of Roses is longer than it used to be, owing to the introduction of varieties flowering at different periods.

Preparing for Planting. A good deal of work is involved in the laying-out and cultivation of a Rose garden, therefore a start cannot be made with advantage in spring, unless, indeed, there is abundance of labour available and the job can be completed quickly. It is better to start as soon as rain has softened the ground in early autumn, so that everything can be ready for the planting before winter comes on. It has to be remembered that laying turf, digging ground two spades deep, making paths, and fixing posts for pillars and arches are all tasks which, however pleasant, take up a good deal of time. Rather than scamp the soil preparation, the planting had better be left till spring. The making of the garden could then be a source of recreation for the winter. There would be no feeling of haste and worry. And while spring planting may not be ideal, Roses well planted in spring in thoroughly prepared soil—soil, that is, which has been trenched and manured—may be expected to do better than Roses planted hurriedly in ill-prepared soil in autumn. Take time, therefore. Making a Rose garden should be no matter for rush and worry. Everything connected with Roses, from beginning to end, must be a source of enjoyment, the preparation equally with the fulfilment.

When planting, 2 ft. apart all ways may form the standard distance for bushes, to be varied according to the vigour of the particular sort. The roots should not be buried deeply, but the soil should be well trodden over them.

Obtaining Plants. The start, whether for a complete Rose garden or for mixed planting in borders on beds, will probably be by purchase of plants; later on, there may be extension by home propagation, which raises several points worthy of consideration.

Propagation by Seeds. Seedling Roses are rarely met with, except on the grounds of hybridists and nurserymen, who raise them with the object of obtaining new varieties. As the natural system of propagation, one would gladly practise seed-sowing with Roses if the practical interests of the garden were served by it, but unfortunately such is not the case. Many types of Roses do not produce hips and the great majority of our fine double Roses bear no seed. Even if they did, the way would not be clear, because, owing to intense interbreeding, the progeny would certainly be of a mixed character and most of it greatly inferior to the garden varieties which we have. Add to this that the seed germinates very slowly, and it will be fully realised that the culture of seedling Roses is not justifiable in general garden practice. But certain Roses, notably the briers (including the Penzance briers) and rugosas, produce hips freely, and it is partly because of this that these species are used so largely as stocks or foster-parents. The hips are gathered when ripe and laid in sand for the winter; in spring the seeds are rubbed out, into the sand if convenient, and both seed and sand sown together. A year may elapse before the seedlings are of any size, and it will be two or three years before they are strong enough to be budded.

However sound the cultivation of seedling briers is in the economy of a nursery, it is not justified in small private gardens, because space can be put to better use. But the Rose lover should know that there is such a thing as a seedling brier stock, and he should further know that it proves to be an excellent foster-parent for most Roses, particularly Teas.

Obtaining Plants: Self-rooting. Certain Roses, particularly the hybrid Wichuraianas, may be said to exhibit a natural system of propagation, since they will on occasion throw out roots from stems which have come into contact with the soil. They may be described as self-layered, as Strawberries often are. Such self-rooted plants may be looked out for near pillar Roses, and when found cut away from the parent plant for use. Taking a hint from the self-layering, the grower may try laying down some of the long shoots, bringing them into close contact with the soil in several places, and where they root taking off the shoot.

Obtaining Plants: Cuttings. Insert in the autumn firm 8-in. pieces of the current year's wood almost up to the tips in the soil, to give flowering plants in two or three years. The plan is well worth adopting by those who object to stocks, and most of the more vigorous Roses do well under it.

Obtaining Plants: Budding. A bud is a slice taken in summer out of a shoot which, in autumn, might otherwise be used as a cutting. But several buds can be cut out of a length that would only suffice for one cutting, and if these buds are inserted singly in separate brier stocks it follows that a given length of shoot is used more economically under the budding than under the cutting system. In some cases, however, the buds are not inserted singly in the main stem of a dwarf brier, but several are put into the various branches of a standard brier, from three to six being used according to the number of shoots which the standard is carrying. Budding presupposes stocks, and these (tall hedgerow briers for standards) may be bought or collected early in autumn and planted after trimming the roots back to one short stump (this to avert the nuisance of sucker growths springing up from the base subsequently), budding them the following summer and flowering them the next. Those who have space may put brier cuttings in during autumn in order to provide dwarf stocks for bush Roses, and this involves some trouble, but small obstacles are not allowed to thwart the amateur who, smitten with a great love for the flower and coveting a representative collection, is yet unable to afford extensive purchases. He may master the art of budding in one lesson if he has a competent teacher, in which case he will have few if any failures; or he may muddle through to competence, spoiling as many buds as he succeeds with. Success turns almost entirely on two small items: pith-removal and moisture. There is a knack in getting the pith away from the bud, after it has been sliced off the shoot with a sharp knife, without dislodging the small green germ at the back of it, and this knack generally has to be learned; it is intuitive with some, while others only acquire it through practice. But the best of bud-makers might fail if the stock was suffering from want of water, and for this reason it is worth while, in a dry July, to wait a reasonable time for rain,

and in its continued absence to give the soil round the stocks a good soaking of water. The bud itself must not be dry for a moment, or it will turn black and fail soon after being put in.

A Propagating Summary. Roses are propagated by budding, grafting, cuttings, layers, and seeds. For general garden purposes, buds, cuttings, and seeds suffice.

Method	*Time*	*Description*
Budding	Summer	Make a longitudinal slit about 1½ ins. long through the bark of each side shoot of the Brier close to the main stem with the point of a sharp knife; make a cross-cut at the top of the slit; raise the edges of the bark with the flat handle of the budding knife. Choose a Rose shoot of the current year's growth and cut out slices of stem 1½ ins. long just below each leaf; remove the pith but leave the bud. Slip the slices into the slits in the Brier and tie with raffia. The buds will grow and flower the following year.
Cuttings	Autumn	Take pieces of the current year's growth about 8 ins. long, remove the lower buds, insert in gritty soil almost up to the top of the cutting, and tread firmly in. Briers for stocks may be raised in the same way and afterwards budded. Cuttings may also be struck in heat in spring. Plants raised from cuttings will flower the first or second year.
Seeds	Spring	Take the hips when quite ripe in autumn——protecting them from birds if necessary——lay in sand and keep in a dry place till spring, then rub out the seeds and sow them with the sand in gritty soil in pans in a frame or greenhouse. Cover with shaded glass till germination takes place. All the seeds are unlikely to germinate simultaneously; some may lie for several months before they start growth. Plants raised from seed will flower in the second or third year. Briers may be raised from seed in the same way and afterwards budded.

Pruning. Although pruning may, in principle, vary with the sort, it is wise to prune hard all dwarf Roses of which the habit is not known in spring after planting, as it gives them a good start, but afterwards the pruning should be regulated by the amount of annual growth. A variety that is so naturally vigorous and well suited by the soil as to make shoots 3 or 4 ft. long in a season need not be shortened much at the annual pruning, the best time for which is the end of March for H.P.'s, and a fortnight later for Teas. Medium

growers may be pruned to within 3 or 4 buds of the base. Most of the rambler Roses are best pruned late in summer—say September—when as many of the old canes as can be spared should be cut out. If there are plenty of strong young canes springing up from the base, all the old wood may go; but where basal canes are few it may be more desirable to shorten old canes to the young wood on them than to remove them altogether. The point is that there should be a nice lot of young wood to get good bloom the following year. If this is tied up the arches in September and exposed to the sun, it gets well ripened and flowers well. Wall Roses, such as Alister Stella Gray, Bardou Job, Cheshunt Hybrid, Gloire de Dijon, Madame Alfred Carrière, and Wm. Allen Richardson, may be pruned in late summer by thinning out old wood and nailing in new to take its place.

Selections of Varieties. In making selections, we consider it prudent to restrict ourselves to proved varieties, leaving the reader to add or substitute such novelties as he may take a fancy to at shows or in gardens and nurseries. Within such limits the following tables may be useful:

I. GOOD VARIETIES FOR BEDS

H.P. = Hybrid Perpetual; H.T. = Hybrid Tea; Per = Pernetiana

Variety	*Section*	*Colour*	*How to Prune*
Augustine Guinoisseau	H.T.	Silvery	Cut out wood 2 years old or older, but prune previous year's growth very lightly, as if well ripened it will flower along its whole length
Betty Uprichard	H.T.	Salmon	Ditto
Caroline Testout	H.T.	Pink	Moderately, leaving about 9 ins. of the previous year's wood
Hugh Dickson	H.P.	Crimson	Leave about 1 ft. of the previous year's wood
Frau Karl Druschki	H.P.	White	Same as Caroline Testout
General McArthur	H.T.	Crimson	Same as Hugh Dickson
Mdme. Abel Chatenay	H.T.	Salmon-pink	Same as Caroline Testout
Mdme. Edouard Herriot	Per.	Orange	Same as Caroline Testout
Mrs. H. Bowles	H.T.	Rose-pink	Same as Caroline Testout
Mrs. John Laing	H.P.	Pink	Same as Hugh Dickson
Richmond	H.T.	Carmine	Same as Caroline Testout
Mdme. Butterfly	Tea	Salmon-pink	Same as Caroline Testout

For bedding in town and suburban gardens choose: Baroness Rothschild, pink H.P., same pruning as Caroline Testout, see above; Boule de Neige, Duke of Edinburgh, and M. Boncenne, see Table II; Mrs. John Laing, see above; Caroline Testout, see above; La France, silvery peach, same pruning as Hugh Dickson, see above; and

Frau Karl Druschki, see above. All will thrive if the air is not very impure. Caroline Testout is perhaps the best of all.

The following Dwarf Polyantha and China Roses are also good for beds or for groups in borders; they produce clusters of small flowers throughout the summer; after the flowering is over they should be pruned hard back; they should be planted close together —about 1 ft. apart:

Anna Maria de Montravel, white
Coral Cluster, salmon-pink
Edith Cavell, scarlet
Laurette Messimy, rose
Cecile Brunner, blush
Crimson Orleans, crimson
Edith Poulsen, deep rose
Leonie Lamesch, copper
Pink Delight

If Roses are wanted for edgings, a selection may be made from the above varieties.

II. GOOD VARIETIES FOR PEGGING DOWN

Variety	*Section*	*Colour*	*How to Prune*
Boule de Neige	H.P.	White	Cut out old wood, but leave the growths of the previous year nearly full length, as they will bloom from end to end. This applies to all the varieties in the present table
Chas. Lefebvre	H.P.	Crimson	
Duke of Edinburgh	H.P.	Vermilion	
Mdme. Gabriel Luizet	H.P.	Silvery pink	
Margaret Dickson	H.P.	White, tinted	
M. Boncenne	H.P.	Dark crimson	

III. GOOD VARIETIES FOR STANDARDS

Most of the more vigorous H.P., H.T., and Tea Roses are good for ordinary standards on stems about 1 yd. high. In pruning, cut previous year's growth to basal buds. The following is a selection:

Variety	*Section*	*Colour*	*Prune*
Anna Ollivier	Tea	Ivory	To 4 buds
Augustine Guinoisseau	H.T.	Silvery pink	To 9 buds
Caroline Testout	H.T.	Pink	To 6 buds
Chas. Lefebvre	H.P.	Crimson	To 9 buds
Ernest Metz	Tea	Coppery	To 4 buds
Frau Karl Druschki	H.P.	White	To 9 buds
Hugh Dickson	H.T.	Crimson	To 9 buds
Jean Ducher	Tea	Coppery rose	To 4 buds
Lady Hillingdon	Tea	Yellow	To 4 buds
Madame Hoste	Tea	White	To 4 buds
Mrs. John Laing	H.P.	Pink	To 6 buds
Mrs. R. G. Sharman Crawford	H.P.	Pink	To 6 buds
Marie Van Houtte	Tea	Cream and rose	To 4 buds
Perle des Jardins	Tea	Yellow	To 4 buds
The Bride	Tea	White	To 4 buds
Ulrich Brunner	H.P.	Cherry red	To 6 buds
Viscountess Folkestone	H.T.	Cream, salmon centre	To 6 buds

But standards are also used with 6 ft. stems, and for these, such varieties as those mentioned under "Weeping Standards" above may be chosen. Dorothy Perkins for one makes a beautiful standard, and when planted where it has plenty of room it makes a lovely specimen, with its long, flower-laden shoots drooping in profusion around the stem. The bare stem is a drawback to standards, and where many are planted it is well to carpet the ground with Violas, to take off the bareness, but they will need frequent renewal.

IV. GOOD VARIETIES FOR PILLARS, ARCHES, AND ARBOURS

Pillars may be used in the Rose garden with noble effect. They make a splendid background for a border if set 3 yards apart and connected by top pieces, or they may be established in groups of 3 or more, the poles about 1 yard apart. The following are fine varieties:

Variety	*Colour*	*How to Prune*
Alberic Barbier	Pale yellow	Needs little, as it does not throw up a thicket of canes like Dorothy Perkins, but produces strong twiggy breast-wood on which the flowers are borne
American Pillar	Carmine, white centre	Same as Carmine Pillar
Carmine Pillar	Carmine	Thin out old canes when the stool becomes crowded, but otherwise do not prune
Crimson Rambler	Crimson	Same as Carmine Pillar, but more old wood will have to be removed, as it is more vigorous
Blush Rambler	Blush-pink	Same as Crimson Rambler
Dorothy Perkins	Pink	Thin the stools freely in summer, after flowering, cutting out old wood and tying in the best of the new shoots. Lady Gay is nearly identical
Félicité-et-Perpétue	White	Same as Carmine Pillar
Hiawatha	Crimson single	Same as Dorothy Perkins
Leuchstern	Rose, white centre	Same as Carmine Pillar, but needs little pruning
Madame René-André	Salmon	Same as Dorothy Perkins
Mrs. F. W. Flight	Pink	Same as Carmine Pillar
Rêve d'Or	Yellow	Much the same as Alberic Barbier

Variety	*Colour*	*How to Prune*
Paul's Single White	White	Same as Carmine Pillar; does not, however, make so much growth on poor soil; needs rich ground
Penzance Briers in variety	Various shades	Same as Carmine Pillar

V. GOOD VARIETIES FOR WALLS AND LOW FENCES

There are many Roses which have very vigorous habit and consequently are commonly described as climbers, but which are not well suited to clothing tall pillars, being better adapted for training on walls and low fences, which they will cover. Thin out shoots to prevent crowding, removing old and weak wood, but do not prune back healthy shoots, which should be nailed or tied in.

Variety	*Colour*
Alister Stella Gray	Yellow
Bardou Job	Crimson
Claire Jacquier	Nankeen
Cheshunt Hybrid	Rose
Gloire de Dijon	Yellow
L'Idéal	Coppery yellow
Mdme. Alfred Carrière	White
Mdme. Pierre Cochet	Deep yellow
Reine Marie Henriette	Red

Alister Stella Gray, Cheshunt Hybrid, Gloire de Dijon, L'Idéal, and William Allen Richardson are 4 of the best climbing Roses for town and suburban gardens; they will thrive where the air is not very impure.

Roses in Pots. Roses may be grown successfully in large pots, such as twentyfours (8½-in.), or sixteens (9½-in.), using a compost of fibrous loam with a fourth of decayed manure or leafmould and enough sand to make it gritty. Suitable plants may be taken up in autumn when the leaves are falling, and after potting plunged in ashes in a sheltered place until winter, when they may be taken into the greenhouse and given a temperature of about 55°, rising to 65° with sun-heat, and falling to 45° at night. With daily syringing, healthy growth should be made and flowers appear in spring. After flowering, the pots may be stood outside, and when the foliage ripens they may be pruned back to about 6 buds each, in readiness for a fresh start.

VI. A TABLE OF PESTS AND REMEDIES

The insects and fungi which attack Roses are often a great source of worry to the amateur gardener, who sees the plants which he has

Roses—*continued.*

cultivated with such assiduity gravely endangered. The following table of descriptions and remedies may be useful:

Pest	*Description*	*Remedy*
Aphis	Small green fly	1 wineglassful commercial nicotine, 6 galls. water, ½ lb. sulphur, boil and use very hot; or use any well-known proprietary insecticide
Beetle	Small gold - marked beetle	Hand-pick
Black Spot	Leaves spotted	Black Spot disfigures the leaves and weakens the trees. 1 oz. sulphide of potassium in 2 galls. of water may be tried
Grub or maggot	Grub, ½-¾ in. long, which lurks in curled leaf	Hand-pick; shake tree and gather up grubs, which descend by threads; it is important to attack early
Galls	Red or moss - like swellings	Cut off and burn
Mildew	White powder on leaves	Both dwarf and climbing Roses are apt to be disfigured by mildew, although it does not attack the shiny-leaved varieties so severely, if at all, as the others. It should be checked directly the white patches show on the leaves by dusting on flowers of sulphur through a small pair of bellows, or by syringing with fresh liver of sulphur (sulphide of potassium) dissolved in water at the rate of half an ounce per gallon
Red rust	Brown spots on leaves	Ditto; pick off and burn worst leaves
Orange fungus	Large bright orange pustules on leaves	Ditto; ditto.
Slugworm	Larvae of a sawfly	Spray the under surface of the leaves with 1 oz. arsenate paste in 1 gall. of water

Rose Acacia. See Robinia hispida.
Rose Bay. See Epilobium angustifolium.
Rose Campion. See Agrostemma and Lychnis.
Rose Mallow. See Lavatera.
Rosemary, Rosmarinus officinalis (rŏs-măr-ī-nus. Ord. Labiatæ). The common Rosemary is a familiar hoary aromatic shrub growing 3 to 4 ft. high, and thriving in friable loamy soil. Propagation is by seeds in spring, also by cuttings in spring and layers in summer. There are silver-striped and gold-striped varieties, also a prostrate form.
Rose of Heaven. See Agrostemma and Lychnis.
Rose of Sharon. See Hypericum.
Rose of the World. See Camellia japonica.
Rosin Plant. See Silphium.
Rotation of Crops. See Vegetables.
Rowan. See Pyrus Aucuparia and Mountain Ash.
Royal Bay. See Laurus nobilis.
Royal Fern. See Osmunda regalis.
Rubus, Bramble (rū-bŭs. Ord. Rosaceæ). Deciduous shrubs and herbaceous plants, in some cases of coarse, rampant habit, as in the Blackberry. Several are well worth growing in the flower garden. Arcticus, herbaceous, which grows only a few inches high, and has pink flowers in early summer, is worth growing on the rockery; there is a fruiting form of it called secundus. Biflorus, a tall species with white flowers in May, has white stems. Chamaemorus, herbaceous, 6 to 9 ins. high, white flowers in summer, is the Cloudberry. Deliciosus is a beautiful shrub, with large white flowers in May. It grows 5 to 6 ft. high, and is spineless; the fruit is edible. Idaeus is the Raspberry, which see. Laciniatus is the Parsley-leaved Blackberry, which see. Phoenicolasius, with pink flowers followed by red fruit, which makes a nice preserve, is the Wineberry. Rosaefolius coronarius (single form) is the Strawberry-Raspberry. Among modern species worth noting are Henryi, evergreen, grey stems; Veitchii, feathery leaves and pubescent stems; bambusarum, trailer, black fruit; and flagelliformis, metallic leaves, white flowers. The Rubuses like a deep, rich, moist soil. The shrubs may be propagated by layering the tips of the canes, the herbaceous species by division.
Rudbeckia, Cone Flower (rŭd-bĕck-ia. Ord. Compositæ). Hardy herbaceous plants with composite flowers, the centres of which are raised and the ray florets drooping. Grandiflora, yellow and purple, late summer, 3 to 4 ft.; laciniata, yellow and green, summer, 4 to 6 ft., and its variety Golden Glow, double yellow; speciosa (Neumannii or Newmannii), yellow and purple, summer, 3 ft.; purpurea, reddish purple, 4 ft. (Echinacea purpurea), and Drummondi, brown and yellow (Obeliscaria pulcherrima is the same plant), are the best. Ordinary soil. Propagation is by division or seed in spring. Drummondi is best raised from seed annually.
Rue, Ruta graveolens (rū-ta. Ord. Rutaceæ). Rue is sometimes used for seasoning as well as for medicinal purposes. Sow or plant in spring. Ordinary soil. See also Herbs.
Runner. A prostrate shoot which roots at the end, as in the Strawberry.
Ruscus, Butcher's Broom, Box Holly (rŭs-cŭs. Ord. Liliaceæ). Useful shrubs that will thrive as undergrowth among larger shrubs and

trees. They have flattened branches and green flowers. The sexes are on different plants, and to have berries it is necessary to plant both kinds. Aculeatus (flexuosus), which grows about 2 ft. high, is the best. Racemosus (Daneae Laurus) is the Alexandrian Laurel. Ordinary soil. Propagation is by seeds or division.

Rush, Flowering. See Butomus umbellatus and Water Plants.

Russellia (russ-ĕl-ia. Ord. Scrophularineæ). A small genus of stove evergreens, of which the best-known is Lemoinei, a hybrid, very attractive with its pendent scarlet tubular flowers. The Russellias thrive in loam, with liberal admixtures of peat, leafmould, and sand. Propagation is by cuttings inserted in sandy soil in a propagator.

S

Sabal, Fan Palm (sā-bal. Ord. Palmæ). Large palms, the most popular of which is Blackburniana, which may grow 20 ft. high, and produce leaves 3 ft. across, much divided at the margins. This is the Fan or Thatch Palm. It thrives with the ordinary treatment of the class. See Palms.

Saccolabium (sacco-lā-bium. Ord. Orchidaceæ). Pretty Orchids, with small fragrant flowers, borne in abundance in long racemes. They need a hothouse, where they should have a light position and a great deal of moisture. A night temperature of 70° to 80° will suit them while growing; from October to March 60° to 65° will suffice. They should be grown in suspended teak baskets, and may be dealt with when they start growing. A mixture of crocks, charcoal, and fibrous peat, surfaced with Sphagnum, suits. They will not need much water in winter, but should not be dried off. Bellinum, various colours, spring; giganteum, purple and white, winter; and violaceum, white and mauve, winter, are the best species. There are several varieties.

Sacred Bean. See Nelumbium speciosum.

Saddle Tree. See Liriodendron tulipifera.

Saffron, Meadow. See Colchicum.

Sage (Salvia officinalis. Ord. Labiatæ). This familiar herb thrives in almost any soil, and is at home on dry chalk. Seed may be used for a start if desired, sowing in heat in March and hardening the seedlings before planting out, but rooted plants of a good strain are preferable. Afterwards, if increase is desired, slips from the stems, each with a heel of the old wood, may be taken in spring and set in the open.

Sagittaria, Arrowhead (saj-i-tā-ria. Ord. Alismaceæ). The native Arrowhead, sagittifolia, and its double variety (also known as japonica flore pleno) are useful plants for the waterside, flowering late in summer. Propagation is by division in winter or spring.

St. Bernard's Lily. See Anthericum Liliago.

St. Bruno's Lily. See Anthericum (Paradisea) Liliastrum.

St. Dabeoc's Heath. See Daboecia polifolia.

St. John's Wort. See Hypericum.

St. Joseph's Lily. See Lilium candidum.

Saintpaulia ionantha (saint-paŭl-ia. Ord. Gesneraceæ). A pretty little warm-house plant, growing only about 4 ins. high, and producing violet flowers late in summer. Loam and leafmould in equal parts, with sand, make a good compost. Leaf cuttings root readily if inserted in moist sand and cocoa-nut-fibre refuse and put into a warm case; when rooted they may be potted singly and subsequently transferred to 5-in. pots. Leaf cuttings may be taken at

different seasons to ensure successional flowering. There are several varieties, differing in tint.

Salads. The principal salads, including Beet, Endive, Lettuce, Radish, etc., are dealt with under their own names in this work.

Salisburia. The species adiantifolia (Maidenhair Tree) is the same as Ginkgo biloba, which see.

Salix, Willow (sā-lix. Ord. Salicineæ). Hardy deciduous trees, of rapid growth in moist places, and therefore suitable for planting at the waterside. Propagation is by cuttings and seeds. To get good drooping plants the pendulous forms are grafted on tall stems. Alba, the White Willow, has several varieties, of which vitellina and v. pendula are good. Caprea is the common Sallow or Goat Willow; the drooping variety of this, pendula, is the Kilmarnock Willow. Retusa is a prostrate grower. Elegantissima has drooping branches. Plant in autumn or spring.

Sallow. See Salix.

Salpiglossis (săl-pi-glŏss-is. Ord. Solanaceæ). Beautiful plants, the most valuable species of which is sinuata, from which have been derived the splendid annuals offered by seedsmen. The flowers are large and the colours are rich. The habit is loose and graceful. They are best treated as half-hardy annuals, being sown under glass with a little heat, and set out 3 ins. apart in shallow boxes to be hardened in a frame before being planted in beds or borders in May or June. They are also good for pots; in this case, flower them in 5-in., using a compost of loam and decayed manure, with sand. The principal seedsmen offer seed of separate colours as well as mixtures. Unfortunately, the plants are apt to go off while in full bloom. If there are any signs of disease, water with Cheshunt Mixture, which see. Linearis, purple, August, 1 ft. (Petunia intermedia), is a half-hardy perennial.

Salsafy or **Salsify,** Tragopogon porrifolium (trago-pō-gon. Ord. Compositæ). Salsify and Scorzonera are two minor tap-rooted vegetables, quite distinct from Carrot, Beetroot, and Parsnip, and of agreeable flavour. Salsify has a cream-coloured root, and good specimens are 9 ins. long by 2 ins. thick at the top; the foliage is slender, almost grassy. Scorzonera (Scorzonera hispanica) has a purple root rather larger and thinner than Salsify, and the foliage is broader. Both may be grown in the same way as other tap roots —that is, sown outdoors in deep, well-tilled, but not freshly manured soil, and covered 1 in. deep, in April. The roots may be 1 ft. apart, and the seedlings thinned to 6 ins. or rather more. They will be ready for use in autumn, and may be lifted and stored like Beetroot, but Scorzonera at all events is hardy enough to be left in the ground most of the winter if desired, and improves as it grows older.

Salt Tree. See Halimodendron.

Salvia (săl-via. Ord. Labiatæ). The Salvias are among the most brilliant of flowers, and are particularly useful for giving bright masses of bloom in winter. The best species for this purpose is splendens, herbaceous, of which several fine varieties are now available, such as Bruantii, Fireball, and Pride of Zürich. They bloom most profusely. Salvia patens, an evergreen, gives us a lovely shade of rich, shining Gentian-blue. This is a summer bloomer. It is so nearly hardy that it may be used for outside beds in mild districts.

In cold, exposed places it is best kept as a pot plant. While these two species are the best of the Salvias, others must not be overlooked; azurea, blue, autumn and winter bloomer, 5 to 7 ft., requires greenhouse culture; Greggii, scarlet, 2 ft., greenhouse; Heeri, scarlet, winter, greenhouse, 3 ft., an evergreen; leucantha, 2 ft., blue, winter, herbaceous; and involucrata Bethelli, crimson, summer, 4 ft., greenhouse, evergreen, are all good. Officinalis is the common Sage, which see. Horminum, purple, early summer, 9 ins., is a hardy annual; Blue Beard is a good variety of it. Rutilans, red, winter, 3 ft., greenhouse, herbaceous, is good. Argentea is a silvery-leaved creeping species, only about 6 ins. high, a good carpeter. There are hundreds of other species.

Compost. Loam, with sand and a little decayed manure, suits Salvias.

Propagation. By seed or cuttings in heat towards the end of winter. The forms of splendens named above should be sown in heat in January, to get flowering plants the same summer. Set the seedlings out in small boxes and harden in a frame before planting out in June. Patens for bedding may be raised in the same way. Horminum and Blue Beard, however, may be sown outside in spring.

Potting. Those grown in pots should be repotted by stages till they get to 6-in., 8-in., or even larger pots. Splendens should be pinched occasionally to ensure a compact habit.

Samara. A winged fruit, such as that of the Sycamore, Ash, Elm, etc.

Sambucus, Elder (sam-bū-cus. Ord. Caprifoliaceæ). Several garden forms of Sambucus are much superior to the common Elder, which is a coarse, straggly tree, only interesting for a few weeks in early summer, except to those who like the wine made from the flowers and fruit. Nigra foliis aureis, the Golden Elder, is good. Racemosa, with white flowers in branched racemes, followed by red fruit, is very ornamental; there are several pretty varieties of it, notably laciniata, plumosa, p. aurea, and tenuifolia. The Elders thrive in ordinary soil, and the old wood should be pruned out after flowering. Propagation is by cuttings of mature shoots in late summer. Plant in autumn or spring.

Sand. Valuable for lightening composts and stimulating root action. Silver sand is good for surfacing the soil when sowing fine seeds or striking cuttings, but coarser sand, such as washed river sand, is better for composts, as it keeps the soil more open. Brown sand should, however, be avoided, as it may contain oxide of iron, which might injure young seedlings and cuttings.

Sand Verbena. See Abronia.

Sandwort. See Arenaria.

Sanguinaria, Bloodroot, Puccoon (san-guin-ā-ria. Ord. Papaveraceæ). The species canadensis is a useful herbaceous perennial, 6 ins. high, with white flowers in spring, before the leaves expand. Major (grandiflora) is a larger-flowered form. They look well in clumps at the front of the border, or in the rock garden. But they thrive under trees in sandy peat and decayed manure or leafmould. Propagation is by seeds in spring, or by division in autumn.

Sanguisorba canadensis. The same as Poterium canadense, which see.

Santolina, Lavender Cotton (santo-lī-na. Ord. Compositæ). Scented sub-shrubs, with yellow flowers. The most popular is Chamae-

cyparissus incana, often grown simply as incana, which makes a pretty white carpet. They like a light, dry soil, and are propagated by cuttings in spring or autumn. Plant in autumn or spring.

Sanvitalia procumbens (sanvi-tā-lia. Ord. Compositæ). A pretty half-hardy annual of trailing habit, with yellow and purple flowers; there is a double variety. Sow under glass in spring, and prick the seedlings out 3 ins. apart in boxes for hardening in a frame before planting out in May.

Saponaria, Soapwort, Fuller's Herb (săp-on-ā-ria. Ord. Caryophylleæ). A large genus of annuals and perennials, mostly hardy. A few are good garden plants, notably calabrica, a dwarf hardy annual with pink flowers, and its white variety alba; ocymoides, a hardy perennial trailer with purplish-rose flowers, the Rock soapwort; and officinalis, a hardy perennial growing about 3 ft. high, pink; the double variety flore pleno is good. They all bloom in summer. Calabrica may be sown outdoors in September to bloom in spring, and in spring to bloom in summer. Vaccaria, red, 18 ins., is a good annual. Ordinary soil. Propagation is by seed and division.

Saprophyte. A plant that grows on decaying matter, animal or vegetable, like many fungi. See also Parasite, a plant that grows on living matter.

Sarcococca (sār-cō-cocca. Ord. Euphorbiaceæ). The comparatively modern species ruscifolia (Ruscus-leaved) has come into use as a substitute or supplement for the Butcher's Broom to plant under trees. It is a hardy evergreen growing about 2 ft. high, with fragrant white flowers, followed by blue-black fruits. Chinensis is a form. Humilis also has white flowers. Plant in autumn or spring.

Sarracenia, Side-saddle Flower (sarra-cē-nia. Ord. Sarraceniaceæ). Singular plants, forming clusters of small pitchers. They are half-hardy perennials from North America. Purpurea is nearly hardy, and is sometimes grown on the rockery, with a covering of Bracken in winter; as are Drummondii, flava, and rubra. They like a cool, moist spot. Plants under glass like a moist atmosphere. Fibrous peat, with charcoal and a fourth of chopped Sphagnum moss, suits. Propagation is by division in early spring in a close, moist, warm case. The plants must have abundance of water during the growing season. A temperature of 45° to 55° will suffice in winter.

Select Species and Hybrids. Drummondii (alba and rubra are good varieties); flava (atrosanguinea, Catesbaei and maxima are good varieties); purpurea and rubra are well-known species. Chelsoni, Courtii, Stevensii, and Williamsii are good hybrids.

Satin Flower. See Sisyrinchium.

Satyrium (să-tŷr-ium. Ord. Orchidaceæ). A small genus of terrestrial Orchids, mostly from South Africa. They are not hardy, but are sometimes grown outside in cool, shady places, or in cold frames. Coriifolium (aureum), with yellow flowers in autumn, height 1 ft., is one of the most attractive species. It likes loam, with leafmould, peat, and sand. Propagation is by division when growth is beginning.

Savory, Satureia (sat-ū-rē-ia. Ord. Labiatæ). Both Summer Savory (S. hortensis) and Winter Savory (S. montana) are used for flavouring and seasoning. The former may be treated as an annual by sowing outside in spring. It is very aromatic. If the stems are cut when the flower-buds appear they can be dried and the plants will throw

up fresh shoots. The Winter Savory may also be raised from seeds, or roots purchased. The old stems should be cut back in spring to get a fresh lot of shoots. Any good soil suits.

Savoy (Brassica oleracea bullata). A hearting form of winter Green, with crinkled leaves, very hardy and useful. Savoys are in season from mid-autumn to the end of winter, when they give way to summer-sown Cabbages. Seed may be sown in April, and the plants treated similarly to Broccoli and Brussels Sprouts, except that the smaller varieties may be planted a little closer. They like firm, fertile ground. They should not be cut until the hearts are quite firm, or the flavour will be inferior. Savoys are subject to the same enemies as the other Greens (see Broccoli). The following are good varieties: Dwarf Green Curled, Early Dwarf Ulm, Perfection, Best of All, Drumhead (large). A Savoy-Brussels Sprout is also obtainable.

Saxifraga, Rockfoil (sax-ĭf-raga, but commonly saxi-frā-ga. Ord. Saxifrageæ). A large and important genus of hardy, alpine plants, the adequate description of which would require a volume in itself. The genus varies greatly, some species being moss-like in growth, others large, loose, and spreading. They are charming for the rock garden, and some may be used for edgings. S. umbrosa, the well-known London Pride, is a case in point.

Soil. No comprehensive compost to suit all can be given, as the species vary in their requirements. The mossy Saxifrages will thrive in ordinary soil provided it is not dry. The encrusted species like a limestone soil. The large, fleshy-leaved Megasea section love a moist soil.

Propagation. By seed, sown in a greenhouse or frame in spring, or, if home-saved, as soon as ripe; also by division and cuttings. Sarmentosa, the well-known Mother of Thousands, is propagated by runners.

The following are good Saxifrages:

Megasea Section. Cordifolia, pink, with its varieties purpurea and alba; ligulata, purple; and Stracheyi, pink, with its white variety alba, may be grown. All bloom in spring.

Mossy Section. A few of the best are caespitosa, white, summer; Camposi (Wallacei), white, spring; decipiens, white, spring (bathonensis is a large red form; variegata and Arkwrighti are also good); hypnoides, white, spring; muscoides, yellowish, spring (the varieties of this called atropurpurea and Rhei are good), and trifurcata, white, spring (variety ceratophylla is good).

Encrusted Section. Aizoon, cream, red dots, early summer; cochlearis, white, early summer; Cotyledon, white, spring, and its splendid variety pyramidalis; crustata, white, dotted red, early summer; Grisebachi, red; Hostii, white, spring; Kolenatiana, red buds, pink flowers; marginata, white; Petrarchii, white; and longifolia, white, dotted red, early summer, are some of the best.

Tufted Section. Apiculata, cream, spring; Burseriana, white, winter, and its larger variety major; Rocheliana, white, summer; sancta, yellow, late spring; and valdensis, white, spring.

Granulata, the white meadow Saxifrage, and its double variety, flore pleno, must not be overlooked; nor must the pretty little oppositifolia, purple, spring, with its varieties, of which major, splendens, Latina (rose) and W. A. Clark (purplish mauve) are good.

Sancta, yellow, spring, likes a high, well-drained site. Sarmentosa, white, spotted, is the well-known Mother of Thousands.

Beautiful Hybrids. In addition to the species and varieties, there are a good many hybrids, among which may be mentioned Boydii, yellow, and its white form alba; Faldonside, cream; Dr. Ramsay, white, dotted rose; Clibrani, red; sanguinea superba, red; Red Admiral, red; Comet, white; rosea superba, rose; and Andrewsi, white, dotted purple, early summer. Macnabiana, white, speckled rose, late spring, is probably a hybrid too. It is evident that the lover of Saxifrages has no lack of materials from which to choose; indeed, with the number of hybrids now appearing year by year, choice becomes almost embarrassing.

Saxigothaea, Prince Albert's Yew (saxi-gō-thĕ-a. Ord. Coniferæ). Conspicua, the one species, is a Chilian evergreen Conifer, growing up to 25 or 30 ft. high in good soil. It is not perfectly hardy, but may be grown in a sheltered place, especially if the soil is well-drained loam. Plant in spring.

Scabiosa, Scabious (scā-bi-ō-sa. Ord. Dipsaceæ). Pretty and fragrant flowers, best represented in gardens by the varieties of atropurpurea, a biennial that is almost always treated as an annual, with dark crimson flowers in summer, growing 2 to 3 ft. high. The double forms of this popular plant are very handsome. The flower-stems are long, reaching to 3 ft. and bearing double globular flowers of very agreeable odour. Perhaps the dark varieties are the sweetest, but all are fragrant. The Sweet Scabious thrives in most soils, and those who love annuals should include it. They will probably learn to value it for cutting as well as for the garden.

Propagation. Every seedsman offers mixtures and some offer separate colours which come true from seed. They are generally raised in a greenhouse or frame in winter, and planted out in June. Although indoor sowing is general, it is not essential, and in the absence of glass the Scabious can be grown as an ordinary hardy annual, sowing outside in April; but the indoor sowing gives very strong and sturdy plants quite early, which transplant readily with a ball of moist earth at the roots, and can be set in clumps in the herbaceous border or in such other places as the grower considers suitable. Caucasica, a hardy perennial growing about 18 ins. high, with large pale-blue flowers, good for the rockery or border, may be raised from seed or increased by division in spring. If seed is sown in heat in February and the plants hardened in a frame for planting out in May, it flowers the same year. There are several special forms of this fine perennial, among which may be mentioned Pride of Exmouth and Pride of Riverslea. There is also a white variety, alba. Graminifolia, blue, 1 ft., is suitable for the rockery.

Scale. There are many species of scales infesting various plants. The females attach themselves to the bark, suck out the juices, lose the power of movement, and lay eggs, which are protected by a horn-like substance. Two of the worst scales attack Apples and Pears. See Pear: Enemies.

Scale Fern. See Asplenium Ceterach.

Scales. In Botany, rudimentary leaves devoid of stalks, which protect the young buds. This is the only kind of leaf that the parasite Broomrape possesses.

Scallions. Young Onions which have not yet formed bulbs.

Scape. A flower-stalk springing direct from the root and without leaves, as in Hyacinths.

Scarborough Lily. See Vallota.

Scarlet Elder. See Elder.

Scarlet Maple. See Acer.

Scarlet Runner (Phaseolus multiflorus). See Beans and Vegetables.

Schizandra (skĭz-an-dra. Ord. Magnoliaceæ). A small genus of Magnolia-like shrubs, of which the best known is chinensis, a climber with fleshy light rose flowers, not very abundant, in summer, followed by scarlet berries which hang a long time. Other species are coccinea, scarlet, early summer; Henryi, white; glaucescens, orange; rubrifolia, deep red; and sphenanthera, orange yellow. They are not quite hardy, and can only be grown outdoors under favourable conditions, otherwise with protection in winter. Loam, with a little leafmould and sand, suits. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in spring.

Schizanthus, Butterfly Flower (skĭz-an-thus. Ord. Solanaceæ). Beautiful annuals, well adapted for pot culture, suitable for sowing in late spring, to bloom in summer, and again in late summer, to bloom the following spring. They flower profusely, and the colours are very bright. The foliage is much cut, and bright green in colour, so that it is ornamental in itself. The majority are half-hardy, but pinnatus, purplish-lilac and yellow, summer blooming, 18 ins. high, is hardy, and may be sown outdoors if desired. There are several varieties of it. Papilionaceus, purple spotted, is popular. Grahami, lilac, 18 ins.; retusus, rose and orange, with its variety albus, white; and wisetonensis, various colours, are the best of the half-hardy species; the last is dwarfest and most compact. In growing for spring bloom, sow in August, get the plants established singly in small pots in autumn, and winter them on a greenhouse shelf, afterwards shifting to 5-in. and 8-in. pots.

Schizocodon (skĭz-ō-cō-don. Ord. Diapensiaceæ). The species soldanelloides is a pretty hardy perennial, only growing 3 to 4 ins. high, with rosy, fringed flowers in early spring. It is a nice rockery plant, liking sandy peat in a shady spot, and propagated by seed or division.

Schizopetalon (skĭz-ō-pet-a-lon. Ord. Cruciferæ). The species Walkeri is a pretty hardy annual, growing about 9 ins. high, with white, fringed, fragrant flowers. Sow outdoors in April, in ordinary garden soil.

Schizophragma (skĭz-ō-phrăg-ma. Ord. Saxifrageæ). A small genus of deciduous shrubs the members of which have been aptly described as Climbing Hydrangeas. The species hydrangeoides, with tapering leaves and white flowers in late summer or early autumn, climbs by means of aerial roots. Integrifolia, a modern species from China, is conspicuous through its white bracts. Both should be grown on or near a wall in cold districts. Sandy loam, with leafmould and sand, suits. Propagation is by cuttings inserted in sandy soil under a bell-glass in summer. Plant in spring.

Schizostylis, Kaffir Lily, Winter Gladiolus (skiz-o-stȳ-lis, commonly shȳ-zŏs-tillis. Ord. Irideæ). The one species is coccinea. The value of this bright little plant is that it blooms in autumn and early winter, when flowers are scarce. It might be called a miniature

Gladiolus, for its leafage and flower-spikes, rising to about 15 ins. high, resemble those of the Gladiolus; it is, however, much smaller. It is quite hardy, and a few clumps of it look very cheerful in the border on a winter day. Mrs. Hegarty has pink and Viscountess Byng rose flowers and are equally hardy. They should be given a sunny, sheltered position, and left to spread. The Kaffir Lily is well worth growing in pots, and 3 plants put into a 5-in. pot in a mixture of sandy loam and leafmould in autumn will enliven the cool greenhouse in winter.

Sciadopitys, Umbrella Pine (sīa-dŏp-itis. Ord. Coniferæ). The species verticillata is an interesting and ornamental tree with a spreading whorl of foliage, hardy if planted in a sheltered place. Loamy soil, lightened with leafmould, is desirable. Propagation is by seed. Plant in autumn or spring.

Scilla, Squill, Wild Hyacinth (sĭll-a. Ord. Liliaceæ). Bright little bulbs, charming in spring beds or on the rockery. They will grow almost anywhere and bloom early. Plant 1 in. deep and 6 ins. apart in autumn. They make pretty margins, and also look well in grass. The Scillas come into bloom with the Snowdrops, and make charming companions for those dainty little flowers. Bifolia, dark blue; and sibirica, bright blue, are pretty dwarf species; and there are white varieties (alba) of both. Campanulata (or hispanica) is a taller plant, and there are now several good garden varieties of it, blue, white, rose, or lavender in colour. Nutans (or festalis) is the English Bluebell, and there are white and pink varieties of it.

Peruviana, the Cuban Lily, is a handsome plant, and there are white and pink varieties of this also.

Scions. The shoots taken off to be grafted on trees or stocks are called scions. See Apples and Grafting.

Scolopendrium, Hart's-tongue Fern (scōlō-pen-drium. Ord. Filices). A large genus when considered as embracing the numerous varieties, but the number of species is few, and only vulgare, the common Hart's-tongue, is of real importance. The number of forms of this variable fern runs to hundreds, and they constitute quite an interesting study for fern lovers. Acrocladon, crispum, cristatum, fimbriatum, furcatum, grandiceps, Kelwayi, marginatum, ramocristatum, ramosum, and variegatum are a few good varieties; there are many sub-varieties. Leafmould, with a third of loam and some pieces of sandstone, suits. Propagation is by spores (see Ferns), except in the case of some of the varieties of tufty habit, which may be divided when growth starts. Vulgare and its varieties are hardy, but many are well worthy of pot culture.

Scorzonera hispanica (scor-zon-ē-ra. Ord. Compositæ). See remarks under Salsafy.

Scotch Elm. See Elm.

Scotch Fir. See Pinus sylvestris.

Scotch Kale. See Borecole.

Scotch Laburnum. See Laburnum.

Screw Pine. See Pandanus.

Scrophularia (scrŏph-ū-lā-ria. Ord. Scrophularineæ). A small genus of herbaceous perennials, of which the best known is aquatica (nodosa) variegata, the leaves of which are marked with creamy yellow. The type-plant is a British native, with small greenish flowers in

June, a native of marshes, and is not cultivated. The variegated form is used in beds and borders, although less frequently than of old. It will thrive in ordinary soil. Propagation is by division in spring.

Scutellaria, Skull Cap, Helmet Flower (scū-tell-ā-ria. Ord. Labiatæ). Hardy and tender herbaceous plants. The most useful of the hardy species are macrantha (baicalensis), purple flowers in summer, 9 ins. high; hastifolia, purple, 6 ins., and indica japonica (japonica), purple and white, a creeping species, all of which may be grown in the border or on the rockery. They like friable soil, and are increased by division in spring.

Sea Buckthorn. See Hippophae rhamnoides.

Seaforthia (sea-fôrth-ia. Ord. Palmæ). Handsome palms. Elegans (Archontophoenix Cunninghamii) is a graceful species. For culture, see Palms.

Sea Holly. See Eryngium.

Seakale, Crambe maritima (crăm-bĕ. Ord. Cruciferæ). One of the most delicious of vegetables when forced. The plant forms a tap root, which, if protected, will push up a thick white stem. The plants are easily raised, and seed may be resorted to, sowing in spring; but 3 years may elapse before the crowns are strong enough to force. If, however, pieces of side root are taken, planted up to the tip 2 ft. apart in fertile, friable soil in spring, and the growths which spring from the crown thinned to one, strong forcing crowns will be formed by autumn of the same year. There are various methods of forcing it, one being to heap soil or house cinders over the crowns in winter, another to pack in soil under the stage of a warm house, a third to cover the crowns with deep pots and heap hot manure over them, a fourth to place in a box in a warm room. Friable soil and plenty of moisture should be provided in all cases of forcing above ground. Lily White is an improvement on the common Seakale.

Sea Lavender. See Statice Limonium.

Sea Pink. See Armeria.

Seaweed. This substance is good as manure, and may be used with advantage for Asparagus, Potatoes, and Turnips. See remarks under Manures.

Secateur. Small hand-pruning shears, which, if kept well oiled and sharpened, are preferable to a pruning-knife in some cases, for example, when working on a ladder.

Sedum, Stonecrop (sē-dum. Ord. Crassulaceæ). A large genus of succulent plants, useful because they will thrive in dry places and in poor soil; they may be put on dry rockeries and on walls; they like limestone. Propagation is by seeds, cuttings (dried before insertion), and division. The following are a few of the best: Acre, yellow, summer, 2 or 3 ins. high, elegans and aureum are good varieties of it; album, white, summer, grows about 6 ins. high; caeruleum, blue, summer, 4 to 6 ins.; Lydium, pale pink or white, summer, about 3 ins.; Sieboldi, pink, summer, about 1 ft.; and spectabile, pink, late summer, about 18 ins. Others are glaucum, hybridum, kamschaticum, sexangulare, turkestanicum, virens, and Rhodiola.

There are many ways of propagating hardy plants, but there is none more pleasurable and satisfying than raising from seed. Nature herself raises 99 per cent of her vegetation by means of seeds, and her methods of sowing are as varied as they are ingenious. Seeds have several merits: they lend themselves best to safe and economical circulation; they yield the maximum quantity of plants at the minimum cost; they will wait for favourable weather; they are the most convenient form for interchange between people at a distance, as, for example, in different countries. Above all, perhaps, they appeal because they bring plant and grower into close intimacy from the first stage of the plant's existence, creating a special love and interest.

Sowing in Frames. Wholesale patch sowing in bed and border is not, however, infallibly conducive to success and the enjoyment which follows in its train, because variations of weather make it difficult to command those conditions of tilth and moisture which are the most favourable to speedy germination. In principle, therefore, the great bulk of the flowering plants and shrubs, other than common hardy annuals and biennials, which are to be raised from seeds should be sown under conditions which bring those important matters completely under the control of the raiser, e.g. in beds of prepared sandy soil in a cold frame, or in pans, pots, or boxes, in a cool house; the latter for very small-seeded or rare plants. The finer the texture of the compost in the frame, the shallower and more even the drills can be made; and with very shallow drills, it is in practice easier to sow small seeds as thinly as they ought to be sown than when the drills are deep and uneven. Furthermore, thinning is less tedious in a frame than in the open, especially if the bed is made well above ground level.

Sowing in Outdoor Beds. Even where no glass is used, we would still recommend a prepared bed, with subsequent transplanting, rather than border sowing for special plants. The site should be one which, while open in the sense of receiving a free circulation of air, is not fully exposed to the sun, more particularly in cases where the grower is compelled to be absent for long periods. With this provision, a more equable state of moisture can be maintained than with full exposure. Yet the site should not be a really wet one, for, apart from increased risk of damping off, slugs will assuredly take a heavy toll unless the cultivator is constantly watchful and prompt with the lime basket. Let the seedling ground, then, be a nursery, however limited in area. Let special attention be devoted to preparing a well-drained, gritty, friable, and moist seed bed, preferably slightly raised. In such circumstances germination will be as swift as the nature of the seed permits, and the seedlings will be strong and thrifty. Transplantation as well as thinning may be called for in certain cases, but the interested grower will not grudge whatever time is necessary for that most fascinating operation. He will have learned to consider every plant, however small, an entity, which it is up to him to carry forward in unchecked growth and health from babyhood to maturity.

Special Biennials and Perennials. Where seed-propagation is

studied, there will be sowing going on from spring to autumn as things come to hand—some, perhaps, from far-distant friends. But the principal sowing period for biennials and perennials will be spring and early summer—say, April to June inclusive.

Many hardy plants ripen their seeds about midsummer and those amateurs who keep in touch with the seedsmen who specialise in good biennials and perennials can then obtain fresh seed. As a rule this new seed germinates very quickly and the plants raised from it make rapid progress. Let the lover of border plants bear this in mind when the fading of some of his earlier flowers reminds him that ripe fresh seed will soon be available. Leafmould may be added to the sowing compost fairly liberally, as facilitating transplantation in addition to encouraging free rooting. For the bulk, any ordinary loamy soil with a copious admixture of sand will suffice. Exceptional requirements as to compost are generally mentioned by the dealer, but indeed they are so rare as to be almost negligible. It is a good thing to heat the soil thoroughly before making it up, as this is a simple means of sterilising it.

A thick layer of cinders should form the base of the bed, in order to discourage worms from working through.

Weeds. One of the little difficulties of the gardener who raises a considerable number of biennials and perennials from seed is the great differences between the germinating periods of the various kinds. Some will germinate quickly under favourable circumstances, but others germinate very slowly, especially when the seed is a few months old, as will be the case with most seeds bought in winter or spring. And whether the seeds are sown in pans (pans are preferable to pots as accommodating more seeds in proportion to the amount of soil used) or in a bed, there will be bother with weeds. A thorough heating of the soil before use reduces this trouble; for the rest, there must be periodical scratching over, otherwise the surface will become a mat of fine vegetation. After germination has taken place the weed trouble is less serious, but it is always present when soil is left undisturbed for a considerable period. The problem is to remove the weeds with as little disturbance of the plants as possible, especially when the seedlings are very small; as soon as they have grown to an appreciable size slight dislodgment is not serious.

Slow Germination. The flower lover who sows seeds which he knows cannot be perfectly fresh must be prepared to exercise patience and he must not be surprised if he has to wait a year for germination in some cases. But generally when the laggards fairly start they move at a good pace, always providing the soil is kept moist—a condition which is facilitated by light shade from hot sun. The grower will naturally reserve his pans and pots for quite small-seeded and rare things. And for very small seeds he will take care to apply the thinnest possible coating of finely sifted soil. See tables under Herbaceous Plants for selections of plants that may be raised from seed.

Sowing Under Glass for Early Bloom. So much for sowing special hardy things. With respect to sowing certain annuals, biennials, and perennials under glass in late winter or early spring to secure plants for putting out in May or June to give bloom the same summer,

the following important rules should be observed: (1) To use pans or shallow boxes, (2) To lay a few flakes of leafmould over the bottom, (3) To use a very fine sandy compost over the leafmould, (4) To fill to within ½ in. or even less of the top, as a deep space generally means over-watering and failure, (5) To make the surface very fine, even, and firm, (6) To sow thinly and cover small seeds very lightly, (7) To provide some shade until germination has started (in nurseries and other large establishments it is common to obtain shade, and at the same time reduce the necessity for watering, by what is termed "clamping," that is, piling the sown boxes one on top of the other), (8) To give light and abundant air directly germination has taken place. Under this procedure, followed by careful watering and early pricking-out 3 or 4 ins. apart into other boxes, failures are few.

Selaginella (sella-gin-ella. Ord. Selagineæ). A large genus of elegant plants, some of which are of trailing habit. They love moisture in summer, but not overhead, so that syringing should not be practised. The creeping sorts should be grown in pans, the upright ones in pans or pots. Loam and leafmould in equal parts, with a good deal of sand, suit. Propagation is by cuttings of the main stems in spring and summer, or by layering. The following are a few of the best: Braunii, erect, 1 ft. to 18 ins.; Galeottei, 1 ft., good for a hanging basket; grandis, branching, should have a close case; Kraussiana (denticulata, Lycopodium denticulatum), creeping; Martensii, branching; and uncinata, trailing.

Selenipedium. This is a section of Cypripedium, only recognised by botanists.

Self. A flower with only one colour. See Carnations, etc.

Self-heal (Prunella vulgaris). This weed may become a serious nuisance if it establishes itself in a lawn, as it is apt to do on damp sites. Prompt action should be taken to prevent spreading. It can be "burnt-off" with strong solutions of sulphate of ammonia or nitrate of soda in water. See Grass and Lawns. Bad patches may be cut out and fresh clean turves substituted.

Sempervivum, Houseleek (semper-vī-vum. Ord. Crassulaceæ). A large genus of succulents which, like the Sedums, will thrive in poor, dry soil. The hardy kinds will grow on walls, roofs, and dry rockeries. They like lime. Propagation is by seeds in spring, or offsets. The following are a few of the principal kinds: arachnoideum, red, early summer, 4 ins. high, the Cobweb Houseleek, many varieties; arenarium, yellow, summer, 6 ins.; glaucum, red, summer, 9 ins.; and tectorum, red, summer, 1 ft., the common Houseleek, of which there are several varieties. Tabulaeformae and variegatum are grown for their foliage and used in carpet bedding.

Senecio, Groundsel, Ragwort (sen-ē-cio. Ord. Compositæ). A large genus, with which modern botanists have now united Cineraria, although they are not supported by gardeners. The species are very variable in habit and duration. Doronicum is a yellow hardy perennial, 1 ft. high. Elegans (Jacobaea elegans) is a half-hardy annual, of which several colours are available (see Jacobaea). Clivorum, orange, 3 ft., is not hardy, but is grown outdoors in favourable places. Macroglossus, the Cape Ivy, is a greenhouse evergreen climber, with pale yellow flowers in summer. Pulcher is a

hardy perennial, 1 ft. high, with purple flowers in autumn; stenocephala, yellow, 2 ft., is also hardy. Macrophyllus is a hardy perennial with yellow flowers and large leaves, best in a sheltered place. Grayi is a dwarf evergreen with grey leaves, which thrives on chalk and endures exposure. Rotundifolius is also a hardy evergreen. The Senecios are not particular as to soil. The annuals are raised from seed in spring, the perennials from seed and by division. Senecio Cineraria is the same as Cineraria maritima, which see.

Sensitive Fern. See Onoclea sensibilis.

Sensitive Plant. See Mimosa pudica.

Sepals. The components of the calyx of a flower.

Sequoia, Wellingtonia (sē-quoi-a. Ord. Coniferæ). Sequoia gigantea is the proper name, botanists tell us, of the magnificent Californian tree known as Wellingtonia gigantea, which has attained a height of over 100 yards and a diameter of 30 ft. in California. It does not approach these extraordinary dimensions in Great Britain, but in deep loamy soil, and uncrowded, becomes a fine tree, well worthy of a place on a large lawn. There are several varieties of it, such as argentea, silvery; aurea, yellow; and pendula, drooping. The other species is sempervirens, the Californian Redwood, which is of pyramidal habit; there are several varieties of this also. The species are propagated by seed, the varieties by cuttings or grafting.

Sericographis. See Jacobinia.

Service Berry. See Amelanchier.

Service Tree. See Pyrus Sorbus.

Sessile. Leaves and flowers devoid of stems or stalks are said to be sessile.

Setting. To " set " fruits, such as Melons, is to transfer pollen from male to female flowers. Setting is necessary with Melons, but not with Cucumbers, unless seed is required, in which case it should be practised.

Shaddock. See Citrus decumana.

Shade. For selections of plants that will thrive in shady places, see table under Herbaceous Plants; also Shrubs.

Shading. See Greenhouses.

Shallon. See Gaultheria Shallon.

Shallot (Allium ascalonicum. Ord. Liliaceæ). This useful member of the Onion tribe is worth a place in every kitchen garden, for it comes into use in early summer, and may be utilised in soups, stews, and pickles, as well as for plain cooking. It is usual to plant bulbs, as seed does not, as a rule, give a crop until the second year, although it sometimes does so the first. The bulbs should be planted as early in the new year as the soil comes into suitable condition for working, and may be half buried 9 ins. apart in rows 1 ft. asunder. A few ashes should be scattered over them to deter worms. If the soil is deep and well manured they will speedily throw up a cluster of narrow leaves, and presently begin to form offsets, which will develop into a large, closely packed cluster by midsummer, when they may be taken up and dried in the sun.

Shamrock. The yellow Suckling, Trifolium minus, and the white Clover, Trifolium repens, both have supporters in the claims made for them as being the true Irish Shamrock. Oxalis Acetosella is also used, but less commonly.

Shamrock Pea. See Parochaetus.

Shanking. See Grape Vines.

Shears. A pair of short-handled shears should be kept in gardens for clipping hedges, and a pair of long-handled, with short blades, for trimming grass verges. They should be kept sharpened and oiled.

Sheep Laurel. See Kalmia.

Shepherdia, Rabbit Berry (shep-hērd-ia. Ord. Elaeagnaceæ). The species argentea is a deciduous shrub with tapering silvery leaves and yellow flowers in spring, which are succeeded, in the case of the female flowers (the plant is dioecious), by scarlet acidulous edible berries; height up to 10 ft., in fertile sandy loam. Propagation is by suckers or layers in autumn. Plant in autumn or spring.

Shield Fern. See Aspidium.

Shifting. Repotting is often spoken of as "shifting" by gardeners. See Potting.

Shirley Poppy. See Poppy and Papaver.

Shortia (short-ia. Ord. Diapensiaceæ). A small genus of pretty hardy perennials, growing but a few inches high, and blooming in spring. They are good for shady parts of the rockery, where they thrive in sandy peat. Propagation is by offsets, which may be removed from strong plants in spring. Galacifolia has white and its form rosea pink flowers. Uniflora, flesh, 4 ins., and its large form grandiflora are charming alpines. The Shortia californica of seedsmen is not a true Shortia, but Baeria coronaria, a yellow trailing annual, flowering in summer. Propagation is by seed sown outside in spring.

SHRUBS: SELECTIONS AND CULTIVATION

The tame and colourless grouping of commonplace shrubs in large, unrelieved blocks gives monotonous and tiresome effects which do not grow less irritating with time. Very little money is saved by it, and very much interest is lost. Particularly should the error of planting large groups of cheap evergreens be avoided. Only where shade imparts obligations should many Aucubas, for instance, be planted together. True, groups are generally better than single specimens, but the groups need not be large ones, and if care is taken to associate kinds which support each other, there is always interest. The case for trees and shrubs is a strong one. They may be made to serve the purpose at once of economical and beautiful gardening.

Shrub-planting as a background for herbaceous plants has been mentioned on another page. See remarks under Herbaceous Borders.

Shrubs for Shelter. When ways and means of carrying on a garden economically are discussed, the extended cultivation of shrubs will certainly be considered, on the ground that after the preparation of the soil and the planting have once been done, a minimum of labour is required. Where shelter is wanted quickly, the evergreens generally planted with that in view—Aucubas, Hollies, Laurels, the commoner Rhododendrons, Veronicas, Hypericums, Laurestinus, Box, the coarser Thuyas, and so forth—will admirably fulfil this mission, together with vigorous deciduous kinds such as Azaleas, Cornuses, Coryluses (Purple-leaved and other Nuts), Deutzias, Diervillas (Weigelas), Philadelphuses, Ribes, Rugosa and other

Roses, Spiraeas, and Tamarisks. And in those gardens where shelter-planting is not called for, these kinds, judiciously intermixed as to evergreen and deciduous, will provide ornament at a moderate cost. An intermixture of low trees, chosen variously for their fruit, their flowers, and their foliage, such as Apples, Cherries, Thorns, Laburnums, Prunuses (including Bird Cherry), ornamental Pyruses, Arbutuses, Acers (including tinted Maples), Crabs, Robinias, the smaller Oaks, and Chestnuts, will do further service.

Special Shrubs. In choosing material for the best positions, not only will such beautiful deciduous shrubs as Ceanothuses (some), Cytisuses (Brooms), Daphnes, Enkianthuses, Forsythias, Halesias, Hamamelises, Hibiscuses, Hydrangeas, Magnolias, Ribes, Stuartias, and Zenobias, with such evergreens as Andromedas, Berberises (some), Ceanothuses (some), Cotoneasters, Daboecias, Empetrums, Ericas, Euonymuses, Kalmias, Loniceras, Olearias, Pernettyas, Rhododendrons, and Yuccas be selected, but graceful Conifers such as the better species of Abies, Cryptomeria, Cupressus, Juniper, Larch, Libocedrus, Picea, and Thuya. A little judgment in placing, a judicious interpolation of Apples and selected ornamental Pyruses, Prunuses, Thorns, Laburnums, and Robinias, and large areas of the garden are permanently dealt with.

Economy in Planting. Shrub-planters often incur needless expense by planting so thickly as to completely furnish the available space the first season, leaving no room for the things to develop and consequently having to go to further expense in thinning. They do this because they cannot bear to see daylight between the shrubs. But gappiness can in a large measure be avoided by the simple expedient of planting the various groups in the respective rows in angles with each other. Given two rows, the shrubs in the back row may be set triangularly with the groups in the front row, instead of directly behind them. Follow this rule out with three, four, or as many rows as there may be room for, and there will be little or no appearance of gappiness, however thinly the components of the different rows may be spaced. Thus is economy combined with early effect. It will further reduce the trouble from this score if Rose pillars are used fairly freely, say, every 25 ft., because these catch the eye and carry it up, where, falling on small standard trees which have also been planted at about every 20 or 25 ft., it engages fresh objects. Half the cost of planting shrubberies could be saved in a great many cases without loss of interest by resorting to simple devices such as these, which add to the ultimate beauty of the border rather than detract from it.

Improving Soil for Shrubs. Vigorous spadework and liberal manuring during the preparation of the ground assist economy in purchase by providing the stimulus for rapid growth. One shrub will do the work of three, and do it better, if the one has good soil to root in and the others bad. Where, however, manure is scarce and dear the spade must do the most important work by deepening the soil.

Pruning Shrubs. Pruning also assists furnishing, particularly in some cases, such as purple-leaved Nuts and Weigelas. If young plants of these are cut down close to the ground in winter, they will break up very strongly in spring, and in a few weeks will fill much more ground than they would have done if they had been left

unpruned. Most flowering shrubs benefit greatly from hard pruning after flowering, the branches which have borne the flowers being cut right out. There are exceptions to this, but they are not numerous. Hints on pruning are given under the separate kinds throughout the book.

The practice of pruning deciduous shrubs, grown for bloom, after flowering—that is, in early summer—should begin the first season that the shrubs bloom, so that it may become a part of the garden routine; otherwise the centres of the bushes may become crowded with semi-flowerless wood before the knife gets to work, with the result that the shrub is hollowed and made unsightly. With early and regular annual pruning the shrub is always well shaped and always well filled with the best of flowering wood.

Sites for Shrubs. The old-time shrubbery, mainly filled with monotonous and tiresome evergreens, was stuffed as far from the house as possible, and generally the farther the better; it was a windbreak and no more. But the modern shrubbery, planted with care and judgment, lightened with Rose pillars and standard trees, and faced with herbaceous plants, is a different proposition. We cannot get it too near; we cannot give it too prominent a place. It may occupy some of the best positions in the garden. It may curve round the lawn or follow the line of the drive. It may skirt the principal paths and lead gently and unobtrusively into woodland. It may take any form we like to give it: circular, oval, serpentine, even rectangular. It may clothe bank or fringe water.

The following tables may be found useful:

I. A SELECTION OF GOOD FLOWERING SHRUBS

Name	*Height in feet*	*Evergreen or Deciduous*	*Season of Flowering*	*Soil*
Amelanchier canadensis	6–15	Dec.	Spring	Ordinary
Andromeda floribunda	3–5	Ev.	Spring	Peat
,, polifolia	1	Ev.	Early summer	Peat
Azaleas in var.	3–12	Dec.	Spring	Peat
Berberis Darwini	3–6	Ev.	Winter and spring	Ordinary
,, stenophylla	5–10	Ev.	Spring	Ordinary
,, Aquifolium	3–5	Ev.or Dec.	Spring	Ordinary
,, vulgaris	5–10	Dec.	Spring	Ordinary
Buddleia Colvillei	6	Dec.	Early summer	Light friable loam
,, variabilis	10	Dec.	Spring	Light friable loam
Ceanothus azureus and vars.	10	Dec.	Early summer	Ordinary

Name	*Height in feet*	*Evergreen or Deciduous*	*Season of Flowering*	*Soil*
Ceanothus Veitchianus	10	Ev.	Early summer	Ordinary
Cotoneaster frigida	10	Dec.	Spring	Ordinary
,, microphylla	4	Ev.	Spring	Ordinary
,, Simonsi	6	Ev.	Spring	Ordinary
Cytisus albus	7–10	Dec.	Spring	Ordinary light
,, scoparius and var. Andreanus	3–6	Dec.	Spring	Ordinary light
Daboecia polifolia	2	Ev.	Summer	Peat
Daphne Mezereum	2–4	Dec.	Winter	Ordinary
Deutzia crenata and vars.	4–6	Dec.	Spring	Ordinary
Empetrum nigrum	1	Ev.	Spring	Peat
Erica arborea	6–8	Ev.	Spring	Peat
,, carnea	1	Ev.	Winter	Peat
,, mediterranea	2–3	Ev.	Spring	Peat
Euonymus japonicus and vars.	6	Ev.	Spring	Ordinary
Forsythia suspensa	12	Dec.	Spring	Ordinary
Halesia tetraptera	10–15	Dec.	Spring	Friable loam
Hamamelis japonica and vars.	6–8	Dec.	Winter	Ordinary
,, mollis	9	Dec.	Winter	Ordinary
Hibiscus syriacus and vars.	3–5	Dec.	Summer and autumn	Ordinary
Hydrangea hortensia	2–5	Dec.	Summer	Ordinary (not fully hardy)
,, paniculata	5–6	Dec.	Early summer	Ordinary
Kalmia angustifolia and vars.	2–3	Ev.	Early summer	Moist peat
,, latifolia	10–15	Ev.	Summer	Moist peat
Kerria japonica double	4–10	Dec.	Spring	Ordinary
Lavender	3	Ev.	Summer	Ordinary
Magnolia conspicua	10–20	Dec.	Winter and spring	Good friable loam
,, grandiflora	10–20	Ev.	Summer	Good friable loam
,, Soulangeana	10–20	Dec.	Spring	Good friable loam
,, stellata	4–6	Dec.	Winter and spring	Good friable loam
Olearia Haastii	4–5	Ev.	Summer	Ordinary friable

A Selection of Good Flowering Shrubs—*continued*

Name	*Height in feet*	*Evergreen or Deciduous*	*Season of Flowering*	*Soil*
Olearia stellulata	4	Ev.	Spring	Ordinary friable
Pernettya mucronata and vars.	3–6	Ev.	Spring	Peat and loam
Philadelphus in var.	6–8	Dec.	Spring	Ordinary
Pyrus (Cydonia) japonica	6	Dec.	Spring	Ordinary
Rhododendron, many vars.	3–12	Ev.	Late spring	Peat
Rhus Cotinus	6	Dec.	Early summer	Ordinary
Ribes sanguineum and vars.	6	Dec.	Spring	Ordinary
,, aureum	5	Dec.	Spring	Ordinary
Roses	2–10	Dec.	Summer	Heavy loam
Rubus deliciosus	6–8	Dec.	Spring	Ordinary
Spiraea in var.	3–6	Dec.	Spring	Ordinary
Stuartia Pseudo-camellia	6–10	Dec.	Summer	Moist friable loam
Syringa (Lilac) in var.	5–10	Dec.	Spring	Ordinary
Viburnum plicatum	4–8	Dec.	Spring	Ordinary, likes peat
,, Opulus (Guelder Rose)	6–10	Dec.	Spring	Ordinary
,, Tinus (Laurustinus)	4–6	Ev.	Winter	Ordinary
Weigela rosea in var.	6–10	Dec.	Spring	Ordinary
Yucca aloifolia and vars.	15–20	Ev.	Late spring	Friable loam
,, gloriosa and vars.	4–6	Ev.	Summer	Friable loam
Zenobia speciosa	4	Dec.	Summer	Sandy peat

By grouping evergreen and deciduous kinds near each other, as previously suggested, the planter can avoid dull gaps in the borders. He may also with advantage note the flowering season of the different kinds, so that spring bloomers may alternate with summer bloomers and thus spread the season of flowering well over the border. The heights are given as a guide, but in one or two cases the plant has a very long flower-stem, notably in the case of the Yuccas. Moreover, the height is naturally influenced a good deal by the soil.

II. GOOD SHRUBS FOR SHADE

Aucubas
Berberis Aquifolium (Mahonia aquifolia)
Cornus (Dogwood)
Gaultheria Shallon
Hollies
Hypericum Androsaemum (Tutsan)
Hypericum calycinum
Rhododendron ponticum
Rosa rugosa vars.
Ruscus aculeatus (Butcher's Broom)
Sarcococca ruscifolia
Vincas (Periwinkles)

III. GOOD SHRUBS FOR TOWN AND SUBURBAN GARDENS

Amelanchier canadensis
Arbutus Unedo
Berberis Aquifolium
Daphne Mezereum
Deutzia crenata
Forsythias
Hypericum calycinum
Kerria japonica (double var.)
Leycesteria formosa
Philadelphus (Mock Orange)
Pyrus japonica (Cydonia)
Ribes aureum and sanguineum
Syringas (Lilacs)
Viburnums
Yuccas

IV. GOOD SHRUBS FOR SEASIDE GARDENS

Berberis Darwinii
Ceanothus americanus
Cistus (Rock Rose)
Cotoneasters in var.
Crataegus (Thorns) in var.
Cytisus scoparius and var. (Broom)
Escallonia
Euonymus japonicus
,, europaeus and vars.
Hippophae rhamnoides (Sea Buckthorn)
Ilex Aquifolium (Holly)
Lavender
Leycesteria formosa
Olearias
Pyrus japonica (Cydonia)
Rhododendron catawbiense
Rosa rugosa
Syringas (Lilacs)
Tamarisk
Ulex europaeus (Gorse)
Viburnum Tinus (Laurustinus)
Yuccas

V. A SELECTION OF BEAUTIFUL SMALL TREES, SUITABLE FOR MIXING WITH SHRUBS

Acers (Maples)
Ailanthus (Tree of Heaven)
Apples in var.
Buddleia globosa
Catalpa bignonioides
Cherries (Prunus Cerasus)
Crataegus (Thorns) in var., particularly double red and double pink
Laburnums
Liquidambars
Liriodendron (Tulip Tree)
Magnolia grandiflora
Prunus James H. Veitch
,, Cerasus, double white
Prunus japonica, double white
,, cerasifera atropurpurea (Pissardii), purple leaves
,, persica, double white, pink, and red vars.
Pyrus Aucuparia (Mountain Ash) and vars.
,, baccata (Siberian Crab) and vars.
,, floribunda
,, Scheideckeri
,, spectabilis
Robinia hispida and vars.
,, Pseudacacia and vars.

There are few tree-lovers but admire the beautiful tints of the autumn woodland, and leaf-beauty is just as much to be sought in the garden. The golden and orange and brown of the ripening leaf play their parts nobly in maintaining the beauty and interest of the border throughout October, when the last flowers have probably gone and the evergreens are beginning to look dull. Berries too give a welcome glow of ruddy colour. In the foregoing selections of trees and shrubs for various purposes, care has been taken to include kinds which provide both autumn leaf-colour and the richness of brilliant fruits.

Sibthorpia (sib-thōrp-ia. Ord. Scrophularineæ). A small genus, comprising one pretty plant in europaea, the Cornish Moneywort, which grows 6 to 8 ins. high, and has pink flowers in summer. Still prettier is the form variegata, which is best grown in a greenhouse or room, and looks well in a hanging basket. Loam and leafmould in equal parts, with sand, suit. Propagation is by cuttings in a frame in spring or summer.

Sidalcea, Greek Mallow (sī-dal-cea. Ord. Malvaceæ). The species candida, white, 2 ft. high, June; and Listeri, pink, September, 3 ft., are the best known of these hardy herbaceous perennials. Ordinary soil. Propagation by seed and division.

Side-saddle Flower. See Sarracenia.

Silene, Catchfly (sī-lē-ne. Ord. Caryophylleæ). Pretty annual, biennial, or perennial herbaceous plants, the majority hardy and good for the rockery or for beds. The most popular is the hardy annual pendula and its variety compacta, which have pink flowers, and do well when sown outdoors in August for spring blooming, but may also be sown outside in spring. Seedsmen offer a white variety and also double forms in distinct colours. Of the perennials, acaulis, pink, early summer, 3 ins. high, the Cushion Pink or Moss Campion, is good, and has several varieties. Maritima flore pleno, double white, is a good hardy trailer. Schafta, deep red, summer, 6 ins.; and alpestris, white fringed flowers, are good rock plants. Sino-Watsoni, rose, is a pretty rose species of modern interest. Ordinary soil. Propagation of the perennials is by division in autumn or spring.

Silk Vine. See Periploca graeca.

Silphium, Compass Plant, Rosin Plant (sīl-phium. Ord. Compositæ). Hardy perennials of little importance, but laciniatum, which grows 5 to 6 ft. high, and has yellow flowers in summer, is interesting from its peculiarity while young of turning its leaves north and south, and hence the name Compass Plant. Other species are perfoliatum (connatum) and scaberrina. Ordinary soil suits. Propagation is by seed or division.

Silver Bell Tree. See Halesia.

Silver Cedar. See Juniperus Virginiana glauca.

Silver Fir. See Abies pectinata.

Silver-leaf. This disease, which causes the leaves of many trees, including Apples, Pears, Poplars (especially pollarded trees), Cherries, Peaches, and Plums, to assume a glazed silvery appearance, is caused by the fungus Stereum purpureum. Affected foliage does not contain the fungus, at all events in any identifiable form, in fact

it does not appear until the branches attacked are dying, when ranges of purple overlapping scales spread over them. There is such a thing as False Silver-leaf, consequently, a tree the leaves of which become grey should not be destroyed immediately, as the next year may see a recovery; but all such trees should be kept under observation, and if branches die with appearance of scales the tree should be burned forthwith. Trees of the same genus should not be planted on the same ground, but an Apple or Pear might follow a Cherry or Plum, and vice versa. Pruning should be done in early summer, when healthy but overcrowding branches can be thinned. Pruning implements used on diseased trees should be dipped in Lysol before other trees are dealt with.

Sinapis, Mustard (sī-nā-pis. Ord. Cruciferæ). See Mustard.

Sisyrinchium, Satin Flower (sĭsy-rĭn-chium. Ord. Irideæ). Pretty hardy perennials, suitable for the rockery, or for culture in pots in a cool greenhouse. Grandiflorum, which has purple flowers in spring, and grows about 1 ft. high, with grass-like leaves, is the most important. There is a white variety. Bermudianum, blue, 9 ins.; and striatum, yellow, 2 ft., are also grown. Loam, with sand and a third of leafmould, suits. Propagation is by seeds in spring or offsets.

Skimmia (skĭm-mia. Ord. Rutaceæ). Hardy evergreen shrubs, of which the principal species is japonica; it produces white flowers in spring, followed by berries if both the male and female forms are planted, and grows 3 to 4 ft. high; there are several varieties, including the fragrant gratissima. Fortunei, with greenish-white flowers; and Laureola, yellow, Citron-scented, are also grown. Peat and loam suit. Propagation is by seeds, sown when ripe, and by cuttings in a warm house under a handlight. Plant in autumn or spring.

Slipperwort. See Calceolaria.

Sloe. See Prunus spinosa.

Slugs and Snails. Gardeners are not yet satisfied of the useful part played by the slug in the economy of Nature. Knowing it as a voracious feeder on young plants, they have classed it as an enemy that must be rigorously repressed. But the slug takes a good deal of subduing. Nocturnal in habits, clever at finding hiding-places, it often ends triumphant. Slugs are more abundant on damp than on dry sites. They love moisture. But moisture in the form of lime-water takes them at a disadvantage, and if any gardener who is much harassed by slugs would make a practice of putting a lump of fresh lime as big as a cocoa-nut in a pail of water, straining off the liquid a few hours afterwards, and watering with it at night, 2 or 3 evenings in succession, he would soon reduce them; or he could slake a little freshly burned lime, take the powder, and dust it about at night. Another remedy is alum, 1 lb. dissolved in a gallon of water and poured over plants or soil at night. A good method of trapping slugs is to put down small heaps of fresh brewer's grains near the plants in the evening, and examine them after dark. Or bran damped with vinegar may be used as a bait. The V. T. H. slug trap, obtainable from large seedsmen, is useful. Growers of alpines should look under overhanging plants on their rockeries periodically, as slugs are apt to establish themselves in cool, moist, shady crevices, and make raids on choice plants. If plants in green-

houses or frames are found injured, a few of the pots in the neighbourhood should be lifted and examined. Slugs often choose the drainage hole of a flower-pot as a hiding-place.

Smilacina (smī-la-cī-na. Ord. Liliaceæ). Hardy herbaceous perennials, related to Clintonias, and of which racemosa (False Spikenard) with lance-shaped leaves on arching stems, and creamy flowers in late spring, 1 ft. high, is perhaps the most used. It thrives in any friable garden soil, and is propagated by division in spring.

Smilax (smī-lax. Ord. Liliaceæ). The "Smilax" of gardens is Asparagus medeoloides (see Asparagus), the Smilax genus of botanists are climbing shrubs of no importance. The former is generally trained up strings, and is planted out in a border, or grown in boxes, in a greenhouse or Vinery.

Smoke Plant. See Rhus Cotinus.

Smoke Wood. See Clematis Vitalba.

Snails. See Slugs.

Snake Millipede. See Millipede.

Snake's Head. See Fritillaria Meleagris and Iris tuberosa.

Snapdragon. See Antirrhinum.

Sneezewort. See Achillea Ptarmica.

Snowball Tree. See Viburnum Opulus sterile.

Snowberry. See Symphoricarpus.

Snowdrop (Galanthus nivalis). Pretty little hardy bulbs, the Snowdrops never look nicer than when hanging their bells above the grass. They are, of course, good for margins of beds, for colonies near the front of a border, for rockeries, and also for pots. They like a cool, shady spot better than a dry, sunny one; and when they have established themselves they should be left undisturbed. The bulbs may be planted 2 ins. deep and 6 ins. apart. Both the common single and double are good, but Alleni, Elwesii and plicatus are larger; see Galanthus.

Snowdrop Anemone. See Anemone sylvestris.

Snowdrop Tree. See Halesia.

Snowflake (Leucojum). The Snowflakes succeed the Snowdrops, flowering in spring and early summer. Both aestivum and vernum have white flowers tipped with green, and are larger in bloom and taller than the Snowdrops. Vernum is the earlier in flower, and is fragrant. The bulbs may be planted 3 ins. deep and 9 ins. apart, and a shady spot is desirable. One of the finest of all the Snowflakes is Vageneri, which flowers late in spring. See also Leucojum.

Snow Glory. See Chionodoxa.

Snow-in-summer. See Cerastium.

Snow-on-the-mountain. See Arabis.

Snowy Fly. See Borecole and Tomato.

Snowy Mespilus. See Amelanchier.

Soapwort. See Saponaria.

Sobralia (sō-brā-lia. Ord. Orchidaceæ). Terrestrial Orchids of tall growth, easy to manage in a hothouse. They have thick roots, but no pseudo-bulbs. Loam and fibrous peat in equal parts, with charcoal and sand, form a suitable compost. Propagation is by division when growth starts. They require water all the year round, but more in summer than in winter. Macrantha, purple, white, and yellow, 4 to 6 ft., flowering in summer, is the best species; there are

several varieties of it, of which albida, Schröder's variety, and splendens may be named. There are also several hybrids.

SOIL: KINDS AND TREATMENT

The soil we deal with in our gardens is the detritus of rocks mingled with particles of decayed vegetation, such as leaves. It varies greatly, in some districts being heavy and tenacious, in others light and loose. We have stiff, dark soils which we call clay, tenacious yellow soil called marl, sand and stones mixed under the name of gravel, reddish or brownish fibrous soil called loam, and white, soft rock called chalk. It would hardly be within our scope to describe at length the geographical changes which have disintegrated rocks and accumulated gritty particles; our business is to deal with soil as we find it.

Drainage. The proper management of the soil, both with respect to tillage and manuring, is vital to success in gardening. It is important to raise the heat of the soil, and the first step to secure that end is drainage and aeration. In gardens above sea-level, and on ground with a natural fall for the water which comes from the clouds and soaks into the soil, there is natural drainage, especially if the soil is loam, gravel, chalk, or sand. If, however, the ground is so situated that there is no outlet, and is stiff, it is advisable to drain it artificially. This is effected by laying 2-in. earthenware pipes in trenches 3 ft. deep and 15 to 20 ft. apart, closer or wider according as the soil is very heavy, or only moderately so. The pipes should converge on a main drain with an outlet at some selected spot.

Aeration. This is facilitated by drainage, as stagnant moisture cannot lie near the surface of drained soil. It is carried farther by loosening the ground nearly to the level of the drains, and this is effected by removing the top-spit and breaking up the under-spit, incorporating at the same time mortar rubbish, road scrapings, coal ashes, and any vegetable refuse available. Heavy, cold, damp soil which is treated in this way soon becomes warmer, drier, and more fertile. In its natural untilled state soil is unsuitable for the principal fruits, and the crops of vegetables are late; in its ameliorated state it will grow good fruit and (given a reasonable amount of shelter) early vegetables. Trees, shrubs, Roses, and flowering plants generally thrive the better in heavy soil when it is drained and aerated. The reason is that more of the nitrifying bacteria which convert manure into plant food can live in the tilled than in the untilled soil.

Selection of Sites. Those who are establishing gardens for market culture should give careful attention to the selection of ground. This is particularly necessary where fruit is to be planted. The best fruit lands are generally found within 50 miles of the sea, where the soil is neither very stiff nor very light. For vegetable culture shelter and a warm aspect are important, because they favour earliness, which means good prices. People who are making gardens for pleasure need not be so particular in the choice of soil, because by concentration they can make it suitable for all crops, without being serious losers.

Clay Soils. Is the natural soil of the garden clay? Then it will suit Celery, Cabbages, and other greens, Leeks, Onions, Peas, Beans, Lettuces, Rhubarb, and Vegetable Marrows. It will give satis-

factory crops of Potatoes if the soil is made friable, always provided that the site is not low and damp. It will suit a number of the best Apples, nearly all Pears, Plums, Raspberries, and Black Currants, and selected Strawberries and Raspberries.

Let us not fear soils of the character of the typical London clay, for they are full of possibilities. When trained and controlled they are good and faithful servants. Hard work in their crude state and high satisfaction in their finished condition are the outstanding features of clays. One finds that in wet spells they have often to be left alone; but in dry periods they save labour in watering by their adhesive powers. Drainage, rough-digging before frost, additions of lime and grit, soon improve dense clays, and then they will grow most things well.

Sand. Sandy soil will give Potatoes of particularly good flavour, and free from disease, but not heavy crops unless the manuring is liberal. It will suit Carrots and Parsnips. It will not yield Peas, Beans, Onions, Leeks, Beetroot, Celery, Greens, and the principal fruits satisfactorily unless it is thoroughly fed and cultivated. It will not grow fruit to perfection without special treatment, such as the addition of decayed turf and manure.

Loam. Is the soil that mixture of clay and sand which the gardener calls loam? Then with proper tillage it will suit nearly all the vegetables and fruits. Happy the gardener who has a loamy soil, for it is fertile, and at the same time friable. A loam leaning rather to sand than to clay is the best of soils for market gardening, for with many of the robust virtues of clay it remains easier to work and gives earlier crops. Wet London clay which has not been "gardened" lies in large lumps when turned by the spade; loam breaks into smaller or quite small lumps according as it leans to clay or sand; sand falls in tiny particles; and this behaviour of the different types of soil affords a rough-and-ready guide to people who do not recognise them at sight. If early crops of the standard vegetables are wanted, as, for example, in market culture, the light, sandy loam is better than the clay, because warmer and more friable. It is accessible immediately after spells of heavy rain. It is easily worked and can therefore be brought into sowing condition quicker. In a word, it is a "responsive" soil. But it needs more manure than clay, not only to build up the spring fertility, but also to use for "mulching" in dry weather with a view to conserving moisture and saving the necessity for constant watering.

Soil light in texture is suitable for succession cropping (see Vegetables) because the early vegetables can be cleared off earlier than from heavy land and because the crops do not grow so bulky. This is especially the case where the aspect is southerly. When the reader hears of numerous small crops being got in one season he may assume that the soil is light and friable, not heavy and stiff. With equal skill, the sum of produce from light and heavy soil is likely to be about the same—from the former a larger number of moderate crops, from the latter a smaller number of abundant yields.

Humus. Colour alone is not a sure clue to the merit of a soil, especially in the neighbourhood of large towns, in spite of the general belief that a dark soil is always fertile. Town soils may be black,

yet impoverished, because they have sustained the deposits of thousands of chimneys and have been stinted of manure. The dark hue of cultivated country soil is either the natural tint of clay and heavy loam, or the artificial shade of humus, created by regular manuring. Thus soil that is "light" in texture and weight may be dark in colour owing to an accumulation of humus. Although the French gardener's soil is dark—dark with accumulations of manure—it is light in texture and very friable, being, indeed, almost entirely composed of humus. Humus is also provided by upland peat and by leafmould.

Chalk. Workers on the southern downlands are familiar with another class of soil—chalk or limestone. It has practically the same virtues and defects as sand, but it gains warmth slower in spring and holds it longer in autumn. Alluvial soils wherein one finds several feet of friable loam over limestone, as along considerable stretches of the Dover Road in Kent, are almost ideal; note the noble Cherries, the splendid Apples and Pears, the early Gooseberries, and withal the bountiful crops of Potatoes and other vegetables which they yield.

Peat. This soil is unsuitable for fruit and vegetables generally, but important for certain ornamental plants. The particular kinds which require peat are given attention in their places throughout the book, and their wants indicated.

Composts. Mixtures of different kinds of soil are desirable for the majority of the plants grown in rooms and under glass. Suitable mixtures are described under the various plants concerned throughout the book.

Manures. These play an important part in improving soil. See Manures.

Solanum, Nightshade (sō-lā-num. Ord. Solanaceæ). A large genus, and one of outstanding importance, inasmuch as it includes the Potato, tuberosum; see Potato and Vegetables. Hybridists have endeavoured to give the garden Potato improved disease-resisting powers by crossing with other species, such as Maglia and Commersoni, but hitherto without success. The latter, the so-called "swamp Potato," will thrive in moist places, but is of no value as a food crop.

Winter Cherry. The genus Solanum includes several plants well worth growing for their ornamental appearance. One case in point is Capsicastrum, the "Winter Cherry," which carries a crop of bright red berries through the winter. This may be raised from seed or cuttings. If the former, sow in a frame or greenhouse in spring; if the latter, rest the old plants in spring, prune them back, water and syringe them, then take some of the young shoots which push and insert them in sandy soil under a bell-glass. The plants may be put outdoors in the summer and potted up into 5-in. about mid-September, using a compost of loam with a little decayed manure and sand. There is a form with variegated leaves.

Various Species. Other ornamental Solanums are crispum, a hardy wall evergreen shrub with blue flowers in summer, followed by yellowish fruits; jasminoides, a greenhouse climber with blue and white flowers in summer, there is a variegated variety; Melongena, the Egg Plant, which see; robustum, a greenhouse species with

handsome foliage, suitable for planting in a sub-tropical garden in summer; and Wendlandii, a warm-house climbing shrub, with lilac flowers in summer.

Soldanella (soldan-ĕll-a. Ord. Primulaceæ). Pretty alpines, well worth growing on the rockery. The most popular species are alpina and pusilla, both of which grow about 3 ins. high, and have drooping blue flowers in April. Minima, lilac, and its white variety alba, 2 ins., make charming carpets. Pyrolaefolia is a variety of the former species; hybrida is a hybrid between the two. Montana, mauve, 4 ins.; and Clusii, which is possibly a deep form of it, are charming. They like a compost of loam and peat, and should be top-dressed with leafmould and grit every autumn. Propagation is by seeds in a frame in spring, and by division after flowering. They should have a cool, moist place in the rock garden. It is well to put a square of glass over alpina in autumn to throw off the winter rains.

Solidago, Golden Rod (sŏl-i-dā-go. Ord. Compositæ). Virgaurea, yellow, 6 ft., is the Golden Rod, which see; there is a dwarf form, nana. Others are canadensis (altissima), elongata, petiolaris, rigida, serotina, and Shortii, all yellow.

Solitary Flowers. Those borne singly on a stalk, as is generally the case with Tulips.

Solomon's Seal (Polygonatum multiflorum). A distinct and graceful plant, growing 2 to 3 ft. high, thriving in shade, and bearing greenish flowers in long, arching stems. It is perfectly hardy, and may be planted out in autumn, but many grow it in pots, using bulb soil and forcing it gently.

Soot. A useful fertiliser for most crops, yielding salts of ammonia, potash, and soda. If applied to garden or lawn in a quantity sufficient to well blacken the soil or grass when rain threatens, it does good, but it should not be put on 2 or 3 ins. thick, as is sometimes done. Nor, when used to dust over plants as a preventive of pests, should it be dusted over young plants when fresh from the chimney, or it may injure them. If soot is put in a bag or piece of sacking and hung in a tub of water, a good liquid manure is formed.

Sophora (sŏph-ora. Ord. Leguminosæ). The most popular member of this genus is japonica, the Pagoda Tree of China and Japan, which is hardy, grows 20 to 30 ft. high, and bears white flowers in summer. Pendula and variegata are drooping and variegated forms respectively. It likes a friable loam. The species is raised from seed, and the varieties are grafted on to it. Viciifolia, feathery leaves and blue and white flowers, is a hardy Chinese species.

Sophronitis (sŏph-ron-ī-tis. Ord. Orchidaceæ). A small genus of Orchids, the most important of which, grandiflora, produces bright scarlet flowers in winter; there are several varieties of it. It may be grown in a shallow pan, in peat and Sphagnum, with a few pieces of charcoal, over crocks; or on a block. Propagation is by division. Although less water will be needed in winter than in summer, the plants must not be dried off. The genera Sophronitis and Cattleya have been crossed, giving the bigeneric Sophro-cattleyas. Sophronitis has also been crossed with Laelia, giving the bigeneric Sophro-Laelia. Further, Sophronitis grandiflora has been crossed with a Laelio-cattleya, giving trigeneric hybrids, or Sophro-Laelio-cattleyas. For particulars, see a modern book on Orchids.

Sorbus. See Pyrus.

Sorrel. This herb (Rumex acetosa) is sometimes used for salads in small proportions. It thrives in ordinary garden soil. Propagation is by division in spring. Flower-stems should be cut back in summer to encourage the production of leaves.

Southernwood. See Artemisia Abrotanum.

Sowbread. See Cyclamen.

Spade. This tool is made in various sizes, but always of steel, and mounted on strong Ash handles. No. 3, with D handles, is a useful medium size. Spades should be kept scraped when in use, and cleaned before being put away. Before being stored for any length of time they should be rubbed with an oily or greasy rag.

Spadix. A fleshy spike bearing both male and female flowers, and growing above them, as in the Arum.

Spanish Broom. See Spartium.

Spanish Chestnut. See Castanea.

Spanish Iris. See Iris.

Sparaxis (spă-răx-is. Ord. Irideæ). Cape bulbs, somewhat resembling Ixias, but flowering rather earlier, and dwarfer. They are good for rockeries and the front of borders, and thrive when planted in light, well-drained, fertile soil; or they may be grown in pots like Ixias. The species pulcherrima is quite distinct from the others, flowering in autumn and growing several feet high. It is hardy in friable, well-drained soil.

Sparmannia (spār-mănn-ia. Ord. Tilieæ). The species is africana, a handsome greenhouse shrub, growing from 6 to 20 ft. high, with white flowers showing a prominent brush of stamens in spring. It thrives in loam with a fourth of peat and some sand. Propagation is by cuttings in spring under a bell-glass in a warm house. It is very easily grown.

Spartium, Spanish Broom, Rush Broom (spār-ti-um. Ord. Leguminosæ). The Spanish Broom is a useful shrub for sandy or other poor soil, on which it may grow 8 to 10 ft. high, and bear a profusion of yellow flowers in summer. Propagation is by seed sown outside in spring, or cuttings under a handlight in autumn.

Spathe. The large bract which encloses the spadix, as in Arum.

Spawn. See Mushrooms.

Spearmint. See Mint.

Specularia, Venus's Looking-glass (spec-u-lā-ria. Ord. Campanulaceæ). The only popular species is Speculum (Campanula Speculum), a purple hardy annual, growing about 1 ft. high, and flowering in summer from seed sown outdoors in spring.

Speedwell. See Veronica.

Sphagnum. A moss much used by Orchid growers, principally owing to its sponge-like power of absorbing water; it grows in swampy places. It may be bought from florists and seedsmen.

Sphenogyne (sphĕn-ŏj-y-nĕ. Ord. Compositæ). The Sphenogyne speciosa of seedsmen is the Ursinia pulchra or speciosa of botansts, a Marguerite-like hardy annual growing about 1 ft. high, with yellow, purple-zoned flowers in summer—a showy plant. Sow outside in spring in ordinary soil.

Spider Orchis. See Ophrys.

Spiderwort. See Tradescantia.

Spigelia, Worm Grass (spī-gē-lia. Ord. Loganiaceæ). A fairly large genus, only one species of which, marilandica, is much grown. This is a hardy perennial with tubular reddish-yellow flowers in summer, growing about 1 ft. high. It is a good rockery plant, thriving in peat and loam, with sand, in partial shade, and propagated by seed or cuttings.

Spike. A flower-stalk on which the flowers are arranged closely with little or no pedicel, as in the Bistort.

Spinach, Spinacia oleracea (spīn-ā-cia. Ord. Chenopodiaceæ). There are few more wholesome and healthful vegetables than Spinach, and its medicinal properties are well marked. All classes should grow it, either as a main crop or as a catch crop between Peas and Beans. It is hardy and easily grown, and the one serious drawback is liability to run to seed (" bolting ").

Varieties. The grower must look partly to varieties and partly to culture as a remedy for this. The ordinary round and prickly varieties (these names come from the character of the seed, not from the leaf) are both addicted to it, especially in hot, dry weather and in poor soil. The Long-standing and Victoria varieties are less prone. The New Zealand Spinach, which is quite different from the rest, is also a non-bolter.

Cultivation. The soil for Spinach should be deep, moist, and fertile. In addition to the ordinary manure, bone flour or superphosphate may be dug in at the rate of 3 oz. per square yard. Where there is a sheltered border available the first sowing may be made in February, and thereafter regular sowings may be made until September, covering 1 in. deep. If several rows are sown in one bed they ought to be 2 ft. apart, and the plants should be thinned to 1 ft. apart. 1 oz. of seed should sow 250 ft. The Perpetual Spinach, or Spinach Beet, is useful, as it produces very large leaves. See Beet.

Spindle Tree. See Euonymus.

Spiraea, Meadow Sweet (spī-rē-a. Ord. Rosaceæ). A useful genus of herbaceous plants and shrubs, giving material for greenhouses as well as for the garden. Astilbe japonica is generally grown under the name of Spiraea japonica, and is sold in the form of dormant roots by bulb dealers in autumn (see Astilbe). It is herbaceous. Other well-known herbaceous Spiraeas are Filipendula and its varieties (the native Dropwort); Aruncus, the Goat's Beard; palmata, crimson, 2 ft. high, and its white variety alba; Ulmaria, the familiar Meadow Sweet, and its varieties; and astilboides, white, 2 ft. high (resembling Aruncus except in height), with its varieties floribunda and Lemoinei. Though hardy, this species is much grown in pots for room decoration. The Spiraea japonica of botanists is a useful plant; it is a hardy shrub, with rose flowers, and is synonymous with the Spiraea callosa of Thunberg; Anthony Waterer and Bumalda are varieties of it. Of the hardy deciduous shrubs, Aitchisoni, arguta, bracteata, cantoniensis, decumbens, discolor (ariaefolia), Douglasi, Lindleyana, media (confusa), prunifolia flore pleno, Van Houttei, and Thunbergi, are particularly good. They thrive in most deep, fertile, fairly moist soils, and bloom in the summer. All are white. Of more modern species, mention may be made of arborea, assurgens, Henryi, mollifolia (prostrate habit), trichocarpa, Veitchii, and Wilsonii.

Pruning. The Spiraeas differ somewhat in their manner of flowering. Arguta and Thunbergi bloom on the previous season's wood, and the pruning, as with others having this habit, should consist in removing the old wood after flowering, leaving the young unshortened shoots to develop and bloom the following year. Japonica, Douglasi and others bloom well on the same year's wood. These may be thinned and cut back in spring, like non-climbing Roses.

Propagation. By cuttings of the young wood of the shrubs in a frame, by division if a number of suckers are thrown up from the roots, and by layering in autumn; herbaceous species by division.

Spit. A gardener's term for a layer of soil. Digging is breaking it "one spit" deep, bastard-trenching, "two spits" deep.

Spleenwort. See Asplenium.

Spore. See Ferns.

Sport. A natural break from the recognised character of a plant. Florists are always on the lookout for sports, because they may have commercial value.

Sprayers and **Spraying.** See Apples and other fruits. Spraying is an essential part of modern fruit-growing, inasmuch as the extension of tree-planting has tended to multiply insect and fungus enemies by the provision of more food. There are many sprayers on the market; a machine made of copper is the best for general purposes, because it will take all sprays except those which contain sulphur. A brass sprayer should be used for a spray containing sulphur. The various insecticides and fungicides are stated under the kinds of fruit concerned.

Sprekelia. The species formosissima is the same as Amaryllis formosissima (Jacobean Lily). See Amaryllis.

Spruce. This name is an abbreviation of Spruce Fir. The Spruces are Conifers belonging to the genus Picea. The "White Spruce" of the foresters is Picea alba, the "Black Spruce" P. nigra, and the common or Norway Spruce, P. excelsa. The first is a valuable tree in Canada, Newfoundland, and North America generally, but it is short-lived in Great Britain, and is not much planted as an ornamental tree nowadays, although it is sometimes used in plantations where cheap Conifers are wanted. The Black Spruce is also a North American tree. As the wood is soft, it is much in demand for making paper pulp, now an important industry in Newfoundland. It is a good tree for moist, alluvial soils in Great Britain, but useless for dry ones. The common Spruce of British forests is a European tree, and has been grown in Great Britain for several hundreds of years. The wood is light and easily worked, but durable, hence it is an important timber tree. Young specimens are much in demand for Christmas trees. It is largely grown in Germany. See also Picea.

Spur. (1) The tubular extension of a petal as in Aquilegias. (2) A short thick shoot on a fruit-tree bearing fruit-buds, and the remains of scales.

Spurge, Caper. See Euphorbia Lathyris.

Spurge Flax. See Daphne Mezereum.

Spurge Laurel. See Daphne Laureola.

Spurring. See Pruning under Apples, Fruit, etc.

Squash. See Gourd.

Squill. See Scilla.

Squill, Striped. See Puschkinia scilloides.

Stachycarpus. See Prumnopitys.

Stachys (stăk-ys. Ord. Labiatæ). A large genus, a few species of which are grown as ornamental plants, and one as a vegetable. Grandiflora (Betonica grandiflora) is a hardy perennial with violet flowers in spring, growing about 1 ft. high. Lanata (Lamb's Ear) has white, woolly foliage. Tuberifera is the Crosnes or Chinese Artichoke; see Artichoke. Propagation is by seed and division in spring. Ordinary soil suits.

Stachyurus (stăky-ū-rus. Ord. Ternströmiaceæ). Evergreen shrubs with tapering saw-edged leaves and flexible stems. Praecox, with drooping yellow flowers in early spring, 8–10 ft. high, is the only species frequently met with. Chinensis also has yellow flowers quite early in the year. They are best on a warm, sheltered wall, in friable soil, as they are not hardy. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in spring.

Stag's Horn Fern. See Platycerium.

Stamens. The male organs of flowers. The number in any true species remains constant.

Standards. Trees with clean stems. In the case of fruit trees, those with clean stems 5 to 6 ft. high are called standards, those with 3- to 4-ft. stems half-standards. See Apple and other fruit trees, also various ornamental trees and Roses.

Stanhopea (stăn-hō-pea. Ord. Orchidaceæ). Hothouse Orchids with flowers in pendulous racemes, suitable for culture in suspended teak baskets in a compost of fibrous peat, Sphagnum, and charcoal. Propagation is by division. They like a good deal of water while growing, but less in winter. Insignis, with yellow and purple fragrant flowers; and tigrina, orange and purple, sweet, are two of the best; there are several varieties of the latter.

Stapelia, Carrion Flower (stă-pē-lia. Ord. Asclepiadeæ). Hothouse plants with large, livid, foetid flowers, thriving in loam with a good deal of sand and pounded brick. Propagation is by cuttings in sand. They resemble Cactuses in their love of sun and drought. Gigantea, purple and yellow; and grandiflora, purple, grey branches, are as much grown as any.

Staphylea (stăphy-lē-a, often stă-phȳll-e-a. Ord. Sapindaceæ). Hardy deciduous shrubs, the most popular of which, colchica, height 3–4 ft., has white flowers, which appear in summer when it is grown in the shrubbery. It is, however, often grown in pots and forced into early bloom. It likes fibrous loam, with a quarter of decayed manure and some sand. Propagation is by seed in spring, cuttings in summer, and layers in autumn. Other species, all white-flowered, are Bumalda, Coulombieri, and pinnata.

Star of Bethlehem. See Ornithogalum.

Starwort. See Aster.

Statice, Sea Lavender (stăt-ĭ-cē. Ord. Plumbagineæ). Graceful plants, some of which are esteemed for greenhouse and some for garden cultivation. Gmelini is a hardy perennial, with dark-blue flowers in summer, about 18 ins. high. Incana nana, a perennial, is also fairly hardy, and has pink flowers, height 9 ins. Latifolia, hardy, blue, early summer, 1 ft., is very popular. Profusa is grown

in the greenhouse, and has blue flowers in summer, height 2 ft. Sinuata, purple, summer, 1 ft., grown as an annual, is not quite hardy; the flowers are largely used for drying. Suworowi, lilac-pink, summer, 18 ins., is a hardy annual. Limonium is the Sea Lavender, and has purplish flowers in summer, height 18 ins. Bonduelli, an annual, has yellow flowers in early summer, height 1 ft. They like a friable, loamy soil. The annuals are propagated by seeds, the shrubs by cuttings, and the perennials by division.

Stauntonia (stāūn-tō-nia. Ord. Berberideæ). A small genus of evergreen climbers, of which latifolia (Holboellia latifolia), with shining leaves and greenish-purple flowers in early summer, height 10 to 20 ft., is the best known. The flowers are not particularly beautiful, but are very sweet. Hexaphylla has white scented flowers in spring. The plants are best grown on sheltered walls, not being hardy. Friable loamy soil suits. Propagation is by cuttings inserted in sandy soil under a handlight in summer. Plant in spring.

Stenactis. See Erigeron. The popular hardy herbaceous plant called Stenactis speciosa is the same as Erigeron speciosum.

Stephanandra (stĕph-an-ăn-dra. Ord. Rosaceæ). A small genus of hardy deciduous shrubs. The species flexuosa (incisa), with pretty arching bracts and small white flowers in July, height 3 to 8 ft., is the best known. Tanakae, also white, is larger, and its leaves assume a brilliant colour in autumn. Ordinary soil. Propagation is by root suckers. Plant in autumn or spring.

Stephanotis (stĕphan-ō-tis. Ord. Asclepiadeæ). A small genus, important only as containing the beautiful white, fragrant hothouse climber floribunda, which is so popular as a cut flower. The Elvaston variety is perhaps superior to the common type.

Compost. The Stephanotis is not difficult to grow, and is best planted out in a bed of turfy loam, with sand, and a third each of decayed manure and peat. The site should be one from which superfluous moisture can drain freely. It loves water, both at the root and overhead, in summer, and vigorous syringing will go a long way towards keeping mealy bug under; it should be done after gathering any flowers that may be wanted for wreaths, etc. Less water will be needed in winter, when a temperature of 55° to 65° will suffice. Go over the plant in winter and thin out weak and crowded growths; old wood may be shortened. A vaporising cone or other fumigant should be burned in the house occasionally.

Propagation. By cuttings in bottom heat, choosing pieces of side shoot, and inserting in pots plunged in bottom heat and kept close.

Stereum purpureum. See Silver-leaf and Plum.

Sterilising Soil. See remarks under Tomato.

Sternbergia (stern-bĕr-gia. Ord. Amaryllideæ). Sternbergis lutea is the same as Amaryllis lutea, which see.

Stigma. The female organ of a flower, to the viscid surface of which pollen adheres. See a modern work on Botany.

Stipa, Feather Grass (stī-pa. Ord. Gramineæ). Hardy perennial Grasses, the most popular of which is pennata, the Feather Grass, which grows about 2 ft. high and flowers in summer. Elegantissima is good. They will thrive in ordinary soil, and are easily raised from seed sown outdoors in late spring, or in a greenhouse or warm frame in winter, to be hardened before being planted out.

Stipe. The stalk of a fern frond.

Stipule. A leafy outgrowth at the base of a leaf-stalk.

Stocks, Brompton, Intermediate, Ten-week, etc. These are among the most popular of garden and greenhouse flowers. Our forebears called them "Stock Gillyflowers," and the modern popular name "Stock" is obviously a simple abbreviation of the old one. We like as many doubles in our Stocks as possible, because the singles are straggly and the flowers fugitive, whereas the doubles are compact in habit and lasting in bloom. Reliable seedsmen contrive to give us a satisfactory percentage, considering that they have to save seed from single flowers. Bearing this fact in mind, we must not complain if a small percentage of singles appear, as, indeed, they generally do. It is well to plant Stocks thickly, because then the singles which are sure to appear can be pulled out without leaving large gaps.

The Brompton Stock. This, the Matthiola incana of botanists, is a hardy biennial, and is sown outside in May and set out in autumn to flower the following year. Seedsmen offer separate colours as well as mixtures.

Ten-week Stocks. These forms of M. incana annua are half-hardy annuals; they may be subdivided into hoary-leaved (ordinary type dwarf or tall (Giant Perfection)) and smooth green (Wallflower-leaved); both are sown in late winter or spring in gentle heat, to be pricked-off 4 ins. apart in shallow boxes and hardened in a frame for planting out in May. The Wallflower-leaved are sometimes sown in the open ground in May, but this is less satisfactory as a rule. Seedsmen offer many beautiful named varieties in different colours.

Intermediate and East Lothian Stocks. These are biennials. They are splendid for pots, and if sown in summer, pricked-off, potted, and repotted into 5- or 6-in., will bloom well in spring in the greenhouse. Crimson, scarlet, purple, and white are procurable in separate colours. They grow 12 to 18 ins. high. It has been stated that while yearling plants of East Lothians give single flowers, 80 per cent of two-year-olds give doubles.

Emperor or Queen Stocks. These may be grown in the same way as the Intermediates or they may be sown in spring for autumn bloom.

Night-scented Stock. Although the botanical name Matthiola rarely appears in connection with the general Stocks of our gardens, the night-scented Stock is offered in most seed catalogues under the name of Matthiola bicornis. Although not ornamental, it is worth growing for its singularly powerful and pleasant evening fragrance. Being mean and weedy-looking during the day, it should not be put in a conspicuous place, yet it should be near the house.

French Stocks. The places of the once popular German ten-week Stocks are now to some extent taken by the Nice strains, which command attention alike by their vigour of growth, their fine spikes of double flowers, and their beautiful colours. The lovely variety Beauty of Nice, with its charming flowers of salmon-pink, has won a secure place in the esteem of Stock lovers; it is often sown in summer to flower in spring. Not less desirable are such varieties as Côte d'Azur, dark blue; Princess Alice, Mont Blanc, and White Lady, whites; Peach Blossom, soft rose; Summer Night and Violette de Parme, violets; Monte Carlo, pale yellow; and Crimson King. The habit is branching.

All the Year Round is a perennial form with Wallflower-like leaves, a useful hardy Stock.

Enemies. With care in watering and ventilating the seedlings, Stocks rarely fail, but losses sometimes occur through attacks by the fungus Phytophthora terrestria (hypogaea). Before sowing, soak the compost in boiling water for half an hour.

Stock, Virginian. A pretty little hardy annual with lilac flowers, suitable for edgings, being sown outdoors in April or May. To maintain a long display, sow thinly, thin the seedlings, and pick off fading flowers.

Stocks, Fruit. Paradise stocks for Apples, Quince stocks for Pears, and stocks suitable for other kinds of fruit, are described under the fruits concerned. See Apples, etc., also Fruit. Stocks for Roses are dealt with under Roses.

Stokesia (stōkes-ia. Ord. Compositæ). The species cyanea is a handsome hardy perennial, with blue flowers in summer, growing about 18 ins. high; purpurea is a purplish form, praecox an early bloomer, and alba a white. They like a friable loamy soil, and are propagated by division in spring. They are suitable for the border or rockery.

Stoking. See Greenhouses: Heating.

Stolon. A runner producing roots, as in the Strawberry.

Stomata. Minute openings in the leaves of plants, formed by the slitting of epidermal cells. See a modern work on Botany.

Stonecrop. See Sedum.

Stone Pine. See Pinus Pinea.

Stork's-bill. See Pelargonium.

Stove, House. See Greenhouses.

Stove, Heating. See Greenhouses: Heating.

Stranvaesia (străn-vē-sia. Ord. Rosaceæ). The species glaucescens is a semi-evergreen, half-hardy shrub, with lance-shaped, saw-edged leaves, and white flowers in early summer. It should have a sheltered place, such as a south wall. Friable loam suits. Propagation is by cuttings inserted in sandy soil under a handlight in summer, or by grafting on the Hawthorn. Plant in spring.

Strawberry (Fragaria). This delicious fruit occupies an almost unique position, inasmuch as it can be fruited within a year of the formation of the plant, and may therefore be brought within the cropping scheme of a kitchen garden if desired. Taking up little room, it is suitable for the smallest gardens; and a bed of Strawberries might very well take the place of the coarse vegetables which are often allowed to occupy far more space than their merits deserve in little places.

Soil. Strawberries will grow in most soils, heavy or light. They like a friable, fertile loam, but they will give good results on well-worked clay, and also on light, sandy soil provided it is well manured. Fair crops can be got from thin, chalky soil by manuring liberally.

Manure. Two barrowloads per rod, or 30 cartloads per acre, of decayed yard manure, supplemented by 6 lb. (or 8 cwt. as the case may be) of artificial manure, will give heavy crops. The artificial may consist of 3 parts superphosphate (or the same quantity of basic slag on limeless soil), and 1 each of sulphate of potash and sulphate of ammonia.

Planting. May be done from September to May inclusive—in fact, if young pot plants are used, they could be put in during showery

weather in summer if desired. Most fruit-dealers strike Strawberries in small pots in order to be able to execute orders at periods when it would not be safe to lift plants from the open. Early autumn is a good time to plant. The rows may be made 30 ins. apart, and the plants set 18 ins. apart in the rows. Spring Onions, early Lettuces, or some other quickly cleared crop may be put between the rows the first spring.

Propagation. Those who wish to raise their own plants should fill a number of 3-in. pots firmly with light, loamy soil in July, set the first plantlets which form on the runners on the soil, and keep them in position with a stone or peg. In about 6 weeks they will have rooted freely, and may be cut away from the runner and planted. But plants should not be allowed to form any runners the first year. A few plants in most beds fail to bloom, and they should be destroyed, as if left runners may be taken from them inadvertently, and the stock of barren plants increased, as the defect becomes chronic.

Fruiting. Strong young plants are quite likely to bear some fruit the first year—that is, the summer after being struck. Long, clean straw should be spread between the rows when they come into bloom, partly to protect the flowers against a late frost, but mainly to prevent the fruit from being soiled in wet weather. If the straw is removed at the end of summer, the weeds cleared off, runners cut away, and the soil stirred, the plants will bear a splendid crop the second year. Thereafter the cropping will turn upon the treatment. If the beds are well dressed annually and are given liquid manure in summer, with artificial manure between the rows in February, they will yield good crops for several years. On the other hand, if the beds are allowed to get crowded, and are not properly cleaned and manured, the fruit will soon become small.

Forcing. Those who want Strawberries in spring should either buy plants ready prepared for the purpose, or shift home-raised plants from small into 6-in. pots in September, using loamy soil with a dash of leafmould and sand. The plants will make a nice plump fruiting crown before winter. They can be put into a gently heated house in January or later. A temperature of 55° to 65° will be better than a very high one. A place near the glass is desirable, otherwise the flower stems will run up weakly and the fruit will be poor. A dozen fruits will be enough to each plant. Water and weak liquid manure should be given while the crop is swelling.

Enemies. During recent years Strawberries have suffered severely from aphis attack. Before planting dip the runners in the nicotine and soft-soap solution. See Nicotine. Strawberries are much subject to mildew, which often whitens the foliage completely. The best remedy is liver of sulphur, which, however, is only effectual when the crystals are kept perfectly fresh up to the time of use in a sealed receptacle. ½ oz. per gallon of water will suffice. The liquid thus made is green, and has a disagreeable smell. It must be used at the first stage of attack.

Varieties. For earliness, productiveness, and good flavour combined there is still no Strawberry superior to Royal Sovereign. One of the best late sorts is Givons Late Prolific. Sir Joseph Paxton and Givons Late Prolific will thrive on heavy land provided it is worked well, while Royal Sovereign, Fillbasket, and some of the older sorts

will succeed on light soil. Laxton's Maincrop and King George V are excellent newer varieties. Laxtonian is a useful midseason sort, and Geo. Monro is good for forcing. Those who want to make Strawberry jam in quantity should grow the little variety Grove End Scarlet, as it keeps its shape well.

Perpetual Strawberries. People who read of Strawberries that give large crops every month in the year should be sceptical, but may try a few rows of Laxton's Perpetual or St. Joseph, as such small-fruited varieties certainly bear successional crops.

Strawberry Tree. See Arbutus.

Strelitzia, Bird of Paradise Flower (strē-lĭtz-ia. Ord. Scitamineæ). Handsome evergreens for a warm greenhouse or conservatory, with flowers of remarkable form and brilliant colour. Reginae, the Bird of Paradise Flower, is the best known. It bears large orange and blue flowers in spring, and grows 3 to 4 ft. high; there are two or three varieties of it. Augusta is a larger species with purple and white flowers. Kewensis is a hybrid raised at Kew between Reginae and Augusta. They like loam and shattered brick, and are best planted out. Propagation is by seeds.

Streptocarpus (strĕp-tō-cār-pus. Ord. Gesneraceæ). Beautiful herbaceous perennials for the warm greenhouse, much improved in recent years by cross-fertilisation; the flowers approach Gloxinias in size, and resemble them in form; the leaves are rough. The species are not much grown, cultivators preferring to buy seeds of modern hybrids from a good firm. Separate colours are offered, and also mixtures. The seed should be sown in a warm greenhouse or frame in spring, the seedlings pricked off, and potted as required till in 5- or 6-in. pots. They may also be propagated by leaf cuttings. Loam, with sand and a quarter of leafmould, suits. The plants will be at their best the second year. They will require a good deal of water while in active growth.

Streptosolen (strĕp-tō-sō-len. Ord. Solanaceæ). The species Jamesoni (Browallia Jamesoni) is a free-growing evergreen shrub, with brilliant heads of orange flowers in spring and summer, suitable for the back wall of a warm greenhouse or a conservatory pillar. It thrives best when planted out in a compost of loam and leafmould in equal parts, with sand. Propagation is by cuttings under a bell-glass. A good deal of water, both at the root and over the foliage, will be appreciated in summer.

Struthiopteris. See Onoclea.

Stuartia (stū-ăr-tia. Ord. Ternströmiaceæ). Beautiful Camellia-like deciduous shrubs, with creamy or white flowers, growing 8 to 10 ft. high in a sheltered sunny position, and in a peaty or loamy soil. The 3 species grown are pentagyna, Pseudo-Camellia, and virginica, and all are beautiful. Propagation is by layering. They like plenty of water in summer. Plant in spring.

Style. In botany, the stem which bears the stigma.

Stylophorum, Celandine Poppy (stȳ-lŏf-or-um. Ord. Papaveraceæ). The species diphyllum, with yellow flowers in early summer, height 1 ft., is a hardy herbaceous perennial, worth growing in a cool shady part of the rockery. Any good friable soil suits. Propagation is by division in autumn or spring.

Styrax, Storax (stȳ-rax. Ord. Styraceæ). A small genus of shrubs,

one species of which, japonica, is hardy and is popular on account of its pretty white flowers and pink buds in spring. It may grow 8 to 10 ft. high in good, loamy soil, lightened with leafmould and sand. Propagation is by layers in autumn. Benzoin should be grown in a warm house and propagated by cuttings. Officinale, which yields the balsamic resin called storax, should be grown in a warm greenhouse except in mild, sheltered places. It has white flowers; height 12 ft. Wilsonii is a modern Chinese species with cream flowers in spring.

Succulents. Plants with fleshy foliage, such as Cacti, Aloes, Agaves, Cotyledons, Crassulas, Sedums, Sempervivums, and Mesembryanthemums, are spoken of collectively as "Succulents." For details, see the genera named.

Suckers. Branches or shoots springing from the base of plants. In some cases, the Raspberry being one, they are used to increase stock; but in others they are objectionable and should be removed as soon as they appear, spudding as close to the base as possible, not merely shortening.

Sulphate of Ammonia. One of the two great nitrogenous fertilisers, the other being nitrate of soda. See remarks under Manures.

Sulphate of Potash. A valuable potash-yielding fertiliser. See remarks under Manures.

Sulphur. Sulphur as a fungicide is familiar to gardeners in the form of flowers of sulphur, but green precipitated sulphur is superior, and can be obtained through large seedsmen and nurserymen. See Mildew.

Sumach. See Rhus.

Sundew. See Drosera.

Sunflowers. The joy of Sunflower culture is not, perhaps, always on the highest plane, except in the sense of altitude, for we find that it often centres in the stature of the plant, and therefore has most in common with the form of horticultural enthusiasm which finds its chief outlet in the weight of a monstrous Vegetable Marrow. But the Sunflowers can do more than grow tall; they can give light and warmth to the garden in a way which few hardy plants are capable of, so that groups are useful in the herbaceous border and the wild garden. Some of the best forms of Sunflower are not tall, notably the Cucumber-leaved (Helianthus cucumerifolius) and its varieties Diadem and Orion, which form handsome bushes 3 ft. high. There is, too, a dwarf form of the common Sunflower called nanus plenus. The Russian Giant and the variety called globosus fistulosus are respectively good single and double forms of the common annual Sunflower, both of tall habit, and the single the stronger of the pair. The so-called "Red Sunflower" is a type with a broad brownish band round the disk. It is an annual and, like the preceding varieties, only needs sowing in the spring where it is to bloom. The beautiful Sunflower Helianthus rigidus Miss Mellish (Harpalium rigidum Miss Mellish) and the varieties of Helianthus multiflorus, are perennials of which seed may not be available. They divide readily, however, and are therefore easily increased after plants have been bought and established. See also Helianthus.

Sun Plant. See Portulaca.

Sun Rose. See Helianthemum.

Superphosphate. One of the most important of all chemical or "artificial" manures. See remarks under Manures.

Surface Caterpillars. These creatures are the larvae of the Yellow Underwing Moth, the Dart Moth, and the Heart and Dart Moth. They feed just below the surface of the ground, and are particularly troublesome in dry seasons, when they do serious damage to Potatoes, Turnips, and other crops. Dressings of soot, salt, or lime may be given. Where convenient, fowls or pigs may be penned on the ground.

Swainsona or **Swainsonia** (swain-sō-na. Ord. Leguminosæ). Evergreen greenhouse shrubs, the best known of which is perhaps galegaefolia (Colutea galegaefolia), a variety of coronillifolia, with purplish flowers in summer, height 4 to 6 ft. They like loam with a third of peat and sand. Propagation is by cuttings in summer.

Swamp Lily, Peruvian. See Zephyranthes candida.

Swan-neck Orchid. See Cycnoches.

Swan River Daisy. See Brachycome iberidifolia.

Swede. See Turnip.

Sweet Alyssum. See Alyssum maritimum (Königa maritima).

Sweet Amber. See Hypericum Androsaemum.

Sweet Basil. See Basil.

Sweet Bay. See Laurus nobilis.

Sweetbrier (Rosa rubiginosa). See Brier and Roses.

Sweet Chestnut (Castanea sativa). See Castanea and Chestnut.

Sweet Gale. See Myrica.

Sweet Marjoram. See Marjoram.

Sweet Maudlin. See Achillea Ageratum.

SWEET PEAS

So beautiful are these flowers in the garden, so fragrant are they, so admirably are they adapted for cutting, that everybody loves them. At the least there should be a mixed row of giant varieties. Or there may be a row made up of short lengths of various named sorts. Or there may be a set of clumps along a border.

Clumps. Groups made by setting plants 9 ins. apart in a ring from 3 to 6 ft. across (the diameter according to the space at disposal) look charming. They can be sown where they are to bloom if desired, but most good growers prefer to raise the plants in pots or boxes under glass towards the end of winter, and plant them out about mid-April. The ground ought to be well prepared for them (see Bastard-trenching and Soil) in advance. Sticks should be put to them early. When they have got up the sticks and started flowering in earnest, soakings of water and liquid manure may be given in dry weather; this, with early and regular picking of the flowers, will ensure blossom for many weeks. While the flower-stems are young they can be plucked out of their sockets quickly, and this is better than cutting. A coat of short decayed manure spread along the surface will do good. Sweet Peas thrive in almost any kind of soil when the cultivation is thorough, but they do not give of their best in shallow, dry soil.

Long-stemmed Peas for Cutting. Many lovers of Sweet Peas who shrink from the elaborate methods of growers for exhibition, especially in the erection of wire frames with tall bamboos and the restriction of the plants to one or two shoots with the concomitant obligations

of disbudding and tying, nevertheless covet the long stems which show-growers obtain, because they permit of the flowers being arranged to advantage in vases. The stalks of naturally-grown plants are fairly long when the plants are young, but come shorter with age. The problem, then, is how to get a plant strong enough to yield many gatherings of long-stemmed flowers without elaborate treatment. The best course is to sow seeds in shallow boxes in February, put them in an unheated frame or in a cool greenhouse close to the glass, pinch off the tips of the plants when they are 4 ins. high, and plant out in April. The pinching will result in the development of a series of basal shoots, generally 3 in number, which should be allowed to extend up the sticks. Side shoots will show on each in due time, but these may be pinched out while quite small, so that the 3 leading growths have nothing to carry but their own leaves and the flower-stems. This serves the purpose of getting long flower-stems. Supported by deeply-worked and moderately-manured soil, it will produce a useful supply of cutting material.

Raising in Boxes. This has the advantage that it provides a stock of plants which may be very useful for putting out in beds and borders in April and May, with or without the subsequent removal of sub-laterals. There are few flower gardeners who do not appreciate such a reserve of Sweet Peas. It is only for a short period that the plants occupy frame- or house-room, for as soon as mild spring weather comes they are safe in the open air. The sowing compost had better be plain loam and sand, the seeds being barely covered with soil and only enough water given (especially in the cases of the whites and lavenders) to keep the soil moist, as a sodden condition is liable to be attended by rotting off.

Planting-out. When the plants are put out it is advisable to shake the soil from the roots, so that they come into immediate contact with the fresh soil of the bed or border; the plants will not flag and die, as advocates of retaining a ball of soil with the roots fear, if a little shade is given, if the border-soil is damp, and if water is given in dry weather. It is entirely a matter of taste and expediency whether the plants are put out in rows or clumps, but in either case 9 ins. from plant to plant is near enough. There is a strong case for clump-plantings in herbaceous borders, where the Sweet Peas do valuable supplementary work for several weeks in summer. And if, after the young plants have been set out in their rings, a few seeds are scattered about the middle of the clump (taking care to choose varieties the colours of which will harmonise with those of the box-sown plants in case they are in bloom together), there will be a succession which may link up June and October.

Colour-blending. While mixed rows of Sweet Peas have a charm of their own, it is unwise to mix colours indiscriminately in a clump. Nor should particular varieties be used without regard to the plants near them. Rather should due thought be given to associating colours which blend, as lavender and cream; lavender and salmon; rose and cream; red, white, and blue; Picotee-edge and pale pink, with or without cream, or lavender, or both; orange and cream. The difficulty of associating salmon with other colours is that the salmons are unable to stand sun, and for this reason should be put

in a semi-shady position, as, for example, on the east side of a fair-sized tree, which breaks and diffuses the sun heat without causing dense shade. Clumps of salmon-coloured varieties grown to themselves can easily be shaded with butter muslin, under which the flowers assume an exquisite tone of colour.

Premature Seeding. Apart from providing material for the house, cutting is good in itself, because it helps the plants to throw up a long succession of flowers, especially if the gathering is done systematically before the flowers fade, as then there is no possibility of seed-production. Early seeding is the worst of stem-shorteners, because it imposes a great strain upon the plants. If there are several plants of each variety growing together, each should be completely stripped of its flowers in turn, in preference to picking a few flowers from each plant simultaneously. There is no appreciable loss of collective beauty, and the complete rest which each plant gets in its turn benefits it and enables it to push a good fresh crop. If possible, the picking should be arranged so that each plant is stripped every two or three weeks.

Soil and Manure. Continuous flowering and the maintenance of long stems turn in a great measure on the health and vigour of the plants. And here the character of the soil comes in. A heavy soil capable of retaining moisture in summer will keep the plants going longer than a very light one in a dry season. In a wet season the light soil will be equal to the heavy, if properly manured, and may be even better, because of the plants keeping free from disease. Taking one season with another, a strong loam on medium clay will give better Sweet Peas than sand or chalk. The lighter the soil the more necessary it is to study the manuring carefully. A moderate dressing of decayed manure—say, two or three heaped barrowloads per square rod—should be the base, and in light soils it is best applied after the principal winter rains are generally over, say, in the early part of March, and dug in deeply. But it should be supported by a phosphatic fertiliser and preferably by two, one soluble and the other insoluble, such as superphosphate of lime and steamed bone flour. These may be supplied together in mixture, in the proportions of 3 lb. superphosphate and 1 lb. steamed bone flour per square rod, and forked lightly into the top-spit. If the supply of decayed manure is short, 1 lb. of sulphate of ammonia may be added to the other fertilisers. Sulphate of potash added to the other fertilisers at the rate of 1 lb. per square rod is beneficial.

Lime and Soot. These should never be used in mixture, unless they can be immediately turned well into the soil, because the lime releases the ammonia in the soot, and if the ingredients were on the surface the ammonia would be dissipated in the air. But each has a good effect in particular circumstances. For instance, lime is beneficial on most heavy soils, especially if they have been manured heavily for several seasons, and it generally does good to apply it to such ground in powder form at the rate of 14 lb. per square rod at any time during winter. If the surface is very lumpy and hard to pulverise, ground limestone is best, applied to the surface early in the winter at the rate of 28 lb. per rod, and left until spring. Lime is also present in builders' rubble, which is admirable for stiff soil. Lime is not generally called for on light land, especially chalk. As

regards soot, it does its best work on light soils and may be dusted on the surface at intervals as it becomes available, both in winter and summer. Several light dustings are better than one very heavy one.

Autumn Sowing. Those who rely on outdoor sowings for their Sweet Peas may try a sowing in autumn if the soil is friable and the site well drained, because if all goes well the plants will give earlier flowers than the spring-sown. Mid-October is generally the best time. The seed should be covered about 2 ins. deep, and the soil drawn up in a low ridge at each side of the young plants when they are 2 or 3 ins. high. This treatment generally ensures their passing the winter safely, although success is never certain in very cold or damp districts. Sweet Peas can be propagated by cuttings, but it is a method of increase which should never be resorted to. Probably harm has been done to the constitution of the plant through the adoption of this system by florists. Keep, therefore, to seeds.

Enemies. It is prudent to anticipate trouble from vermin by moistening the seeds in linseed oil and then rolling them in red lead before sowing, especially with spring sowings. With respect to disease, one cannot promise immunity. Some authorities consider that the spores are transmitted with the seeds, and consequently it is a good plan to soak them for a few hours in a solution of 1 oz. permanganate of potash per gallon of water before sowing. It is doubtful whether anything can be done if the plant is struck just as it gets nicely into bloom, and it is wise to pull out and burn plants the buds and flowers of which crinkle up, while the tendrils become very abundant with a disposition to sterility, and the leaves get streaky. These conditions indicate an attack by the bacterium Bacillus Lathyri, which causes the disease commonly called "streak." This is worst on ground overdone with yard manure; moderate manuring, with artificials as advised above, reduces the trouble. In cases of mildew on the leaves—more common in culinary than in Sweet Peas—a spraying of 1 oz. liver of sulphur per 3 gallons of water may be tried, supplemented, if the weather is dry, first by a heavy watering and then by a soaking of liquid manure. Whenever there has been extensive disease among the plants, whether in the form of mildew or otherwise, the sticks should be burned when the crop has been cleared off, not kept for use again the following year. Any knife or scissors used in gathering should be dipped in a 2 per cent solution of Lysol.

Staking. Sweet Peas should be staked early and thoroughly. With 10-ft. hazel sticks available, chop twigs from the upper part to set among the seedlings before driving the sticks in 1 ft. apart.

Sweet Peas are just as happy on trellis-work as they are on sticks, and this should be remembered by suburban gardeners, who often use wooden trellising for making divisions in their gardens. But the plants are not at home in narrow town gardens with high walls or fences, the haulm being weak and the flower-stems very short; they like a garden where there is a free play of air. One does, however, occasionally see examples of successful culture in the forecourts of suburban streets, generally in fairly wide, airy streets and on a western aspect.

Exhibition Cultivation. Deep trenching and proper manuring, on

the lines suggested above, form the basis of success. The next item is a healthy seedling with abundance of fibrous roots, and this is obtained by sowing in pots or boxes in autumn or wintering in well-ventilated frames; or sowing in pots or boxes in late winter. The plants are set 9 ins. or 1 ft. apart, often diagonally, and given long bamboo stakes supported by wires. Watering and mulching are attended to. Pruning, or more correctly disbudding, is severe. A plant is rarely allowed to develop more than 2 stems, and with some varieties only 1, side shoots being removed early. Thus treated, the shoots become broad and flat, and carry very long stems each with 4 flowers. They are gathered for show the night before while dry, and with not more than 2 flowers open, the others being buds. The stems are put into water and kept in a cool shady place until the time comes to pack up, when they are wrapped carefully in soft paper and kept there till the show-room is reached, when they are replaced in water while the stand is being prepared.

Sweet Rocket. See Rocket.

Sweet Sultan. As stated under Centaurea, the purple Sweet Sultan of seedsmen is the Centaurea moschata of botanists, the white and yellow being varieties of the purple. But some botanists make the yellow a separate species under the name suaveolens. The point is unimportant to gardeners, who obtain Sweet Sultans from seedsmen under the separate colours and sow them outdoors in spring. Giant strains are available in various shades. The purple and white grow about 2 ft. high, the yellow is rather shorter. Sweet Sultans do best in well-drained warm soil in a sunny position.

Sweet Violet. See Violet.

Sweet Williams. Time was when the only Sweet William which was considered of any importance in gardens was the florist's "Auricula-eyed"—a strain rather than a variety, inasmuch as there were certain differences of marking. These ringed flowers have given way in most gardens to self-coloured varieties, such as Carmine Beauty, Pink Beauty, and Scarlet Beauty—forms of dwarf habit, bushy, free-flowering, and sharp in colour. One fears that the old florist might not approve of them, but they are undoubtedly beautiful. These modern Sweet Williams are useful for forming clumps in the front area of mixed borders, and also for bedding; but as regards beds, one must remember that Sweet Williams do not fit in so conveniently between spring and summer bedders as Wallflowers, their best flowering season being June. They come nearly, but not quite, true from seed; slight differences of tone are apt to show themselves. One sows these Sweet Williams in early summer with the Wallflowers, perhaps in a spare plot to transplant, perhaps where they are to flower with subsequent thinning. It should be borne in mind that they " move " quite readily even when well advanced in growth, provided they are not allowed to suffer from want of water. Like most of the Dianthuses, they appreciate a lime-dressed or chalky soil.

Sword Lily. See Gladiolus.

Sycamore. As is stated under Acer, the Sycamore is the Acer Pseudo-platanus (Mock Plane) of botanists. It is a useful tree, as it will thrive in most soils, including chalk, and endures exposure; there

are many varieties, including white and yellow edged and purple-leaved. Prinz Handjery is good.

Sycopsis (sȳ-cŏp-sis. Ord. Hamamelideæ). The species sinensis is a hardy evergreen shrub introduced from China in 1909, with leathery leaves, conspicuous by its red stamens, height 10–15 ft. It thrives in any friable garden soil. Propagation is by layers in autumn. Plant in autumn or spring.

Symphoricarpus, Snowberry (sȳm-phŏr-i-cār-pus. Ord. Caprifoliaceæ). Hardy, free-growing shrubs, the most popular of which is racemosus (Symphoria racemosa, of the *Botanical Magazine*, t. 2211). It has rose flowers in early summer, followed by white fruits, which are eaten by game; height about 6 ft. Occidentalis is also grown. They are not fastidious as to soil. Propagation is by suckers or cuttings in autumn.

Symplocos (sȳm-plō-cos. Ord. Styraceæ). Evergreen shrubs, of which the species crataegioides, with lance-shaped, saw-edged leaves and white flowers in spring resembling Hawthorns, height 3 to 6 ft., is the best known. Japonica and tinctoria have yellow flowers. They are not hardy, and need a sheltered place. Friable loam suits. Propagation is by cuttings inserted in sandy soil under a bell-glass in autumn. Plant in spring.

Synthyris (sȳn-thȳ-ris. Ord. Scrophularineæ). A small genus of hardy herbaceous perennials suitable for semi-shady parts of the rockery. The best-known species is reniformis, with leathery toothed leaves and violet flowers in spring, height 6 ins. Ordinary friable soil. Propagation is by division in spring.

Syringa, Lilac (sē-rīn-ga. Ord. Oleaceæ). An important genus. Vulgaris is the common Lilac and Persica the Persian Lilac. There are many varieties of the former and several forms of the latter. See remarks under Lilac. Among good modern species are Julianae, lilac; reflexa, rosy-lilac; Wilsonii, pink; and Wolfii, violet. Yunnanensis, pink; Emodi, white, 9 ft.; Josikaea, lilac, 8 ft.; and japonica, a late bloomer with Privet-scented flowers, are other species of modern interest.

Syringe. A garden implement of much value in hot weather, when the occupants of vineries, Peach-houses, Orchid-houses, and indeed plant-houses generally, benefit greatly by "damping down," that is, syringing the glass, walls, and paths, about 3 p.m. This creates a refreshingly humid atmosphere. In many but not all cases the plants themselves are benefited by syringing. In buying a syringe, it is worth while to consider getting one with a spraying as well as a plain nozzle; it can then be used for applying fungicides and insecticides.

T

Tabernaemontana (tăb-er-nē-mŏn-tan-a. Ord. Apocynaceæ). Hothouse shrubs, the best of which, coronaria and its double variety flore pleno, are very useful, owing to the abundance of fragrant white flowers that they give in summer. They grow 3 to 4 ft. high. Crispa is a fringed variety of coronaria. Fibrous peat and loam in equal parts, with sand, make a good compost. Propagation is by cuttings inserted in heat in spring or autumn under a bell-glass. The young plants thus raised should be pinched to induce a compact habit. The plants may be trimmed after flowering, cutting out old flowered wood.

Tacsonia (tac-sō-nia. Ord. Passifloreæ). Brilliant greenhouse climbers closely related to the Passifloras. They look best when trained, not too stiffly and tightly, under a greenhouse or conservatory roof. Van Volxemi (grandis) is perhaps the most popular; it has large crimson flowers in summer, and thrives in a cool house. Insignis (Passiflora insignis), also crimson, likes rather more heat. Manicata (ignea), scarlet, is good.

Compost. They thrive in loam and sand and a fourth each of decayed manure and leafmould, and should be planted out in preference to being kept in pots. A deep bed should not be made, or the growth will be too luxuriant; in any case thinning will be needed now and then. The shoots which have flowered should be cut back to the old wood in winter, and fresh flowering growths will then push.

Propagation. By cuttings of young shoots in spring, in a warm, close case or under a bell-glass. Or seed of Van Volxemi may be sown in gentle heat in spring.

Enemies. Syringing will tend to keep mealy bug and red spider in check, but the house should be vaporised with a cone or otherwise disinfected every fortnight through the growing season.

Tagetes, Marigold (ta-jē-tes. Ord. Compositæ). The African Marigold is T. erecta, and the French T. patula; see Marigold and Annuals. The variety of T. signata called pumila is popular; it grows about 6 ins. high, and covers itself with small orange-yellow flowers in summer; it may be grown from seed sown in a box in February, the seedlings being pricked-off 2 ins. apart, and planted out 9 ins. apart in May, or sown outdoors in April or May. It will thrive in almost any soil. Golden Ring and Golden Gem are popular varieties.

Tamarix, Tamarisk (tăm-a-rix, tăm-a-risk. Ord. Tamariscineæ). Valuable shrubs for seaside planting, of dense habit. Chinensis (japonica plumosa or simply plumosa) is quite hardy, and bears pink flowers freely in summer. Gallica (the anglica, africana, and parviflora of gardens) and hispida (kashgarica) are also hardy; the former has pale pink and the latter carmine-rose flowers. The

variety of hispida called aestivalis, mauve, is very fine if pruned hard every spring. It makes a good bed when mixed with Liliums umbellatum and tigrinum. Pentandra, rose, and tetandra, blush, pink buds, are also good. If pentandra is cut back in spring it grows 5 ft. high, and flowers in September. The Tamarisks like a sandy or chalky soil, and may be propagated by cuttings in a warm house or frame. Plant in autumn or spring.

Tanacetum, Tansy (tăn-ă-cē-tum. Ord. Compositæ). The Tansy is used for garnishing. Roots may be purchased and planted in April.

Tanakaea (tan-a-kē-a. Ord. Saxifrageæ). The species radicans is a rare Japanese plant with charming plumes of white bloom in early summer, height 6 ins. It is a nice subject for the rockery, where it will thrive in any friable soil. Propagation is by division in spring.

Tangier Pea. See Lathyrus tingitanus.

Tar. Useful in gardens, coal tar as a preservative of wood, Stockholm tar as a dressing for wounds on trees made in pruning or in excising canker.

Tar-distillates. Important tar-oil insecticides. See remarks under Apples. While they certainly have the power of killing not only injurious insects, but also their eggs, there is reason to suppose that by destroying at the same time the parasites of red spider they lead to increased trouble from that pest.

Tarragon (Artemisia Dracunculus). Used in salads and for flavouring (see Herbs). Roots may be purchased and planted in April. Ordinary soil.

Tassel Bush. See Garrya elliptica.

Taxodium, Swamp Cypress (tax-ō-dium. Ord. Coniferæ). Deciduous trees, the most popular of which, distichum, is a Cypress-like plant, with a thick trunk and swollen base, often called the Swamp Cypress; denudatum, fastigiatum, pendulum, and nanum are varieties. Heterophyllum and mucronatum are other species grown to some extent. They like a moist situation, rarely thriving on hot, dry sites. Propagation is by seeds, cuttings, and layers. Plant in autumn or spring.

Taxus, Yew (tăx-us. Ord. Coniferæ). Hardy evergreen trees, of interesting, if somewhat sombre, appearance. The species baccata is the common Yew of the churchyard; there are many varieties of it, among which may be mentioned argentea, silver striped; aurea, yellow; Dovastoni, drooping, and its sub-varieties aureo-pendula and variegata; erecta, upright; fastigiata, pyramidal, the Irish Yew, and its variegated forms; and fructu-luteo, with yellow fruit. Canadensis is the Canadian Yew.

Yew Hedges. The Yew is used a good deal as an inner hedge plant, and clipped into formal shapes, as in topiary work. The drawback to its use as a boundary hedge is that it is poisonous to cattle and horses. Small plants of the variegated Yews look well in the border and in window-boxes. The Yews are not particular as to soil.

Propagation. By seed in spring, cuttings in a frame in summer, or layers in autumn. Special varieties are increased by grafting. Plant in autumn or spring.

Tea Berry. See Gaultheria procumbens.

Tecoma (tĕ-cō-ma. Ord. Bignoniaceæ). Twining shrubs, with large showy tubular flowers. Grandiflora (Bignonia grandiflora), scarlet, is nearly hardy, and may be grown outside except in cold places;

it flowers in summer. Plant in spring. Jasminoides, with white and red flowers in summer, should be grown in a greenhouse. Radicans (Bignonia radicans), scarlet, summer, is hardy on a wall; praecox is an early and Thunbergi a late variety of it. Smithii is a hybrid, an erect shrub, with yellow orange-shaded flowers, in autumn and winter, in the greenhouse. Height 18 ins. The Tecomas like sandy loam, and are propagated by seeds or root cuttings.

Tecophilaea (těk-ō-fĭl-ia. Ord. Haemodoraceæ). The species Cyanocrocus, a pretty Crocus-like bulb, produces its blue, white-throated flowers in spring on stems about 6 ins. high; Leichtlinii and Regelii are varieties of it. They like a light, friable loamy soil, and are propagated by seed in spring or offsets while dormant. They are good for rockery or frame culture.

Telekia. See Buphthalmum. Telekia speciosa is the same as Buphthalmum speciosum, a hardy herbaceous perennial.

Tellima (tell-ī-ma. Ord. Saxifrageæ). An unimportant genus, one species of which, however, grandiflora, a hardy perennial with greenish flowers in April, about 2 ft. high, is worth growing. Propagation is by seed, or division in spring. It likes sandy peat.

Tenby Daffodil. See Daffodil, Narcissus obvallaris.

Tendril. A modified leaf with twining powers, as in the Pea.

Tennis, Lawn. The formation of tennis-lawns and the care of the grass thereon are dealt with under Grass and Lawns, which see.

Terraces. When a house is built on sloping ground, more or less levelling is necessary, and it is not unusual to form a terrace in front of the principal rooms, supported by a wall or bank. With a large area available, more than one terrace may be made. The levels may be laid out as gardens, and the walls planted with suitable climbers.

Testudinaria, Elephant's Foot (tes-tū-din-ā-ria. Ord. Dioscoreaceæ). The species elephantipes (Tamus elephantipes) is a singular plant, with a large woody covering to the rootstock; it is a deciduous climber with yellow flowers in summer, requiring a warm greenhouse. Loam and peat in equal parts, with sand, suit. Propagation is by cuttings under a bell-glass in spring.

Teucrium, Germander (tēu-crĭ-um. Ord. Labiatæ). Evergreen shrubs and herbaceous plants, of which Polium (aureum), a herb or sub-shrub with downy leaves and yellow flowers in summer, height 1 ft., is the best known of the cultivated species. Fruticans, blue flowers in summer, height 3 ft., is an evergreen, not quite hardy, but sometimes grown on an outside wall; it likes a friable loamy soil. Propagation is by cuttings inserted in sandy soil under a handlight in summer. The species Chamaedrys is the wild Germander.

Thalictrum, Meadow Rue (thal-ic-trum. Ord. Ranunculaceæ). Hardy herbaceous perennials, admired as much for their elegant fern-like foliage as for their flowers, which, however, are also attractive. The most popular species, perhaps, is minus (adiantifolium), the foliage of which resembles the Maidenhair Fern; the yellow flowers are borne in early summer on stems about 1 ft. high; there are several varieties. Anemonoides (Anemone thalictroides), with yellow flowers in early spring; and aquilegifolium, purple flowers in early summer, grow about 1 yard high; atropurpureum is a good dark variety of the latter. Dipterocarpum, rosy purple, with yellow anthers, growing 3 to 4 ft. high, a hardy herbaceous perennial,

introduced from China in 1907, has become popular; there is a white form, album. Fendleri has fern-like foliage. The Thalictrums are good for the herbaceous border, where they thrive in friable loamy soil. Propagation is by seed or by division of the rootstock in spring.

Thermometer. An instrument for registering the temperature. There are 3 scales in use: the Fahrenheit, in which the freezing point of water is 32°, and the boiling point 212°; the Réaumur, freezing point 0°, and the boiling point 80°; and the Centigrade or Celsius, freezing point 0°, boiling point 100°. The Fahrenheit is used in this work. Thermometers should be fixed in a central position in a house, and shaded from the sun. A "plunging" thermometer, with a long perforated tube, is made for testing the heat of beds.

Thermopsis (ther-mŏp-sis. Ord. Leguminosæ). The species montana is a silky-haired perennial with yellow flowers in late spring, height 18 ins. Ordinary soil. Propagation is by seeds under glass in spring. For T. laburnifolia see Piptanthus nepalensis.

Thinning. A practice which becomes the more necessary the thicker the plants come up. Crowded plants are rarely good. Thin sowing saves much labour in thinning. Thinning is best done when the soil is moist. See remarks under Annuals, Vegetables, etc.

Thistle, Globe. See Echinops.

Thistle, Melon. See Cactus (Melocactus).

Thorn. The best garden Thorns, of which Double Scarlet is typical, are among the best of small flower-garden trees. Nurserymen offer prepared standards with straight stems suitable for planting between November and March inclusive. They should be staked securely. See also Crataegus.

Thorn Apple. See Datura Stramonium.

Thorn, Box. See Lycium.

Thorn, Evergreen. See Crataegus and Pyracantha.

Thorn, Glastonbury. See Crataegus.

Thrift. See Armeria maritima.

Thrips. A small, lively insect (Heliothrips Adonidum) which infests both the foliage and flowers of many plants, indoors and out. Vigorous syringing and vaporising with cones or fumigating at fortnightly intervals from April to October under glass will keep it in subjection. Outdoors, syringing with a paraffin emulsion is good (see Paraffin). Peas sometimes succumb to thrips when languishing in poor or dry soil. With liquid manure and mulchings they make a better fight.

Throatwort. See Trachelium.

Thuja (Thujopsis). See Thuya.

Thunbergia (thŭn-bĕr-gia. Ord. Acanthaceæ). Beautiful evergreen warm-house climbers. The most popular is alata, which bears yellow flowers in summer; alba, white; and aurantiaca, orange, are varieties of it. Although they are perennials, they are best treated as annuals. Coccinea, scarlet; erecta (Meyenia erecta), orange and blue; fragrans, white, sweet; and grandiflora, blue, are other good species. They may be grown against low pillars. Alata is good for hanging baskets, and may be grown in a cool house. Propagation is by seeds sown in a warm house or frame in spring, or by cuttings in a warm case in summer. Loam, with a third of peat, and a little decayed manure or leafmould, suits.

Thunder Plant. See Sempervivum tectorum.

Thunia. Now classed with Phaius, which see.

Thuya, Arbor Vitae (thū-y-a. Ord. Coniferæ). Hardy evergreen Conifers, one of which, occidentalis, is the well-known American Arbor Vitae, sometimes grown as a garden hedge (see Hedges). There are numerous varieties of it, among which dumosa (pygmaea), ericoides, lutea, nana, pendula, argenteo-variegata, and aureo-variegata may be mentioned. Orientalis (Biota orientalis), the Chinese Arbor Vitae, also has many varieties, notably argenteo-variegata, aureo-variegata, elegantissima, pendula, and pygmaea. Dolabrata is a handsome Thuya, and its variegated form is good; these are suitable for lawn trees. Gigantea (the Lobbii of nurserymen) is the largest species, and has several varieties. Botanists now call it plicata. Thuyas like fertile, well-drained loamy soil. Propagation is by seed in a frame in spring and cuttings in a frame in summer.

Thuyopsis. The species dolabrata is the same as Thuya dolabrata; see above.

Thyme, Thymus (tȳ-mus. Ord. Labiatæ). Aromatic shrubs, used both for the kitchen and flower garden. Vulgaris is the common garden Thyme, and citriodorus the Lemon Thyme. Serpyllum, pink, and its varieties albus, white; atropurpureus, purple; coccineus, red; lanuginosus, woolly, and variegatus, variegated leaves, are used as carpeters on the rockery. They are not particular as to soil. Propagation is by seed in spring, also by cuttings and division.

Thyrsacanthus rutilans (thur-sa-can-thus. Ord. Acanthaceæ). A winter-flowering hothouse plant, with scarlet flowers in winter, height about 2 ft. Peat and loam in equal parts, with sand, suit. Propagation is by cuttings in a warm case in summer.

Tiarella, Foam Flower (tī-ar-ella. Ord. Saxifrageæ). The species cordifolia is a beautiful hardy herbaceous perennial, with white flowers in feathery racemes in spring, when it is one of the best ornaments of the border or rockery. Peaty soil suits it. Propagation is by division in spring.

Tibouchina (tī-bou-chī-na. Ord. Melastomaceæ). Evergreen shrubs, suitable for the roof of a warm greenhouse or conservatory. Elegans and semidecandra (Pleroma macranthum), both with purple flowers in summer, are the best; there is a good variety of the latter called floribunda. Loam and peat in equal parts, with sand, suit. Propagation is by cuttings in a close case in summer.

Tiger Flower. See Tigridia.

Tiger Lily. See Lilium tigrinum.

Tigridia (tī-grĭd-ia. Ord. Irideæ). Short-lived, but richly-marked flowers, blooming late in summer. They are fairly hardy, thriving in sandy, friable, well-drained soil in a sunny spot; but not reliable in cold, damp soil. Conchiflora, the shell flower, yellow spotted with red; grandiflora alba, white, spotted; grandiflora rosea, pink; and Pavonia, red with darker spots, are good sorts. They may be obtained from bulb-dealers and planted in autumn.

Tilia, Lime, Linden (tĭl-ia. Ord. Tiliaceæ). See Lime Tree.

Tillandsia (tĭll-ănd-sia. Ord. Bromeliaceæ). Hothouse evergreens, with richly coloured leaves and bracts. Peat and loam in equal parts, with sand and small crocks, suit. Propagation is by suckers in spring. Corallina (Vriesia corallina), Lindeni, splendens, and

tessellata are a few of the best species. There are many handsome hybrids, such as Duchartrei, Rex, and splendida.

Tilth. One can understand a beginner in digging sighing, as he surveys a piece of rough, uneven ground, covered with weeds, for the moment when the spade can be laid aside at the end of a completed task and lighter tools taken in hand for the final tillage. And more especially can one understand this after his first spell of work, which has probably caused a disagreeable stiffness, and, having most likely been continued too long, has left an uncomfortable feeling of lassitude. But one can also understand that as the end of the digging draws near a feeling of regret asserts itself. Directly experience has taught how much work can be done with advantage at each spell—and by the time wisdom has come into her own the muscles will have accustomed themselves to the action of lifting and turning spadefuls of soil—stiffness and lassitude will both vanish. Every bout will be anticipated with pleasure. Each breadth of freshly turned ground, high yet even, will arouse a sentiment of pride and satisfaction.

But the digging is only the first stage of the tillage and presently rake and hoe must have their turn. They will be satisfactory if the digging has been good, but not otherwise.

It is next to impossible to get a good tilth out of a badly dug piece of ground. When frost has been at work on a plot dug in autumn or winter and left in a lumpy state, one generally finds that it crumbles readily under the rake, but not always. Some diggers ridge the soil in order to give the frost a better chance of getting well into it. Ridging answers best on a gentle slope, where superfluous water can escape quickly. It is not always satisfactory on a low site where water lies on the surface for long periods in wet winters, because the soil gets into a greasy state and frost does not penetrate freely. Think twice, therefore, before ridging ground. If new to the neighbourhood, it might be worth while to ascertain the general local practice.

There are soils the tilth of which can only be won by making additions in the form of leafmould, or mortar rubbish, or road sweepings, or lime, or wood ashes. When the soil will not crumble under the spade and obstinately refuses to break down under hoe and rake, as may happen with clays which are dug late after a wet spring and are hardened immediately by dry winds, add lime and grit and after the next rain try again, then reward may follow.

The tool known as the Canterbury hoe proves very helpful in reducing stiff soil. Or a heavy wooden hay-rake may be used with advantage. Afterwards, the small iron rake comes in. It should be used with the handle near the horizontal, not near the vertical. At about 35° the worker can sweep the rake evenly up and down, himself at a comfortable stoop, and the soil is left smooth and level.

Tipula (Daddy-long-legs). See Daddy-long-legs.

Tithonia (tī-thō-nia. Ord. Compositæ). The species speciosa, 4 to 6 ft. high, with brilliant orange flowers in summer, may be grown as a half-hardy annual, sowing in heat, in February, and hardening in a frame before planting out in May or June. It should have a fertile, loamy soil.

Toad. A friend of the gardener, as it feeds on slugs and insects. For this reason it is sometimes put into plant-houses.

Toadflax. See Linaria.

Tobacco. See Nicotiana.

Todea (tō-dea. Ord. Filices). Filmy ferns, requiring to be grown in a close case in a saturated atmosphere (see Ferns). Superba is the best, but hymenophylloides is also good.

Tomato (Lycopersicum esculentum). Strictly, the Tomato is a fruit, but it is more often used as a vegetable, and is accepted as such at shows. No fruit or vegetable developed in such an astonishing way during the last few years of the 19th century as the Tomato. From being little more than a botanical curiosity it progressed until it became one of the most considerable items in the great industry of market gardening. Hundreds of acres of glass houses are devoted to its culture, and it is grown in the majority of private gardens. A native of South America, the Tomato is a tender plant in Northern climes, and it is unfortunately liable to fungoid diseases, which are worst in cool, damp summers. This renders outdoor culture precarious.

Diseases: Sterilising. Much can be done to keep indoor Tomatoes healthy by growing them in sterilised soil, and where trouble from eel-worm, "sleepy disease," and other pests is persistent, it is worth while for those who grow on a large scale to go to the expense of sterilisation, which is effected by heating, either with steam or by baking. If the soil is to be steamed it should be heated to a temperature of 210° for several hours. See the Journal of the Ministry of Agriculture, October 1929. The only disease that is likely to attack plants in sterilised soil is yellow spot (Cladosporium fulvum), and this can be kept under by maintaining proper ventilation and avoiding too damp an atmosphere. Should it appear, dust with green sulphur while the leaves are damp. White fly (Aleyrodes) is a still more serious pest, best subdued by fumigating the house with Cyanogas or other special compounds; see directions on the receptacles. It is a great aid to keeping indoor Tomatoes healthy to maintain a brisk, fresh, buoyant temperature; and this may necessitate lighting the boiler fire sometimes even in summer when the weather is chilly and "muggy."

Compost. Plain loamy soil, with nothing beyond a slight admixture of potash (1 lb. of sulphate of potash per barrow-load), suits Tomatoes. In market culture the plants are generally planted 24 by 16 ins. apart in large houses, but if grown in pots, let 10-in. be the largest size, and when the plants are shifted to them from smaller pots do not fill up at once; wait until they are rooting freely, then give a top-dressing.

Propagation. Tomatoes are generally propagated by seed, but cuttings are occasionally used in autumn by those who want winter Tomatoes. The seed is sown in winter or spring, according to the season when the crop is required. For very early crops the seed should be sown in January or February, for summer crops in March. The first sowings may be made in a propagating pit, heated frame, or warm house, the latter in a cool house.

Potting and Stopping. The plants should be pricked off a few inches apart into shallow boxes when they begin to crowd each other, and

potted separately when they touch each other again. Care should be taken not to over-water in spring. Each plant will need a strong stake. As fast as the side shoots show in the axils of the leaves they should be nipped out, so that the plants are kept to one stem. Flower clusters will appear in short shoots on the main stem. When 3 bunches of fruit are formed the following mixture of chemical manure may be prepared, sprinkled over the soil, and watered in twice a week: 1½ part superphosphate, 1 part sulphate of ammonia, ½ part sulphate of potash.

Outdoor Cultivation. Plants for outdoor cultivation may be raised similarly to the others, and either put into 5-in. pots in April or into fairly deep boxes. They may be planted out about the beginning of June, a little earlier or later according to the district. They may be set 18 ins. apart against a south or west wall, or in rows alternately 27 ins. and 18 ins. apart (to facilitate working), the plants 1 ft. apart, and supported with strong stakes in the open. In either case it will probably be found convenient to stop them at about 4 ft. high. The side shoots may be suppressed as in the case of pot plants. If sprayed with Bordeaux Mixture towards the end of June, and again at the middle of July if the weather is damp, disease can be kept at bay, but it is not dangerous in dry seasons. Rich soil should be avoided, and a light dressing of superphosphate and sulphate of potash, 2 oz. of the former to 1 of the latter per square yard, will be better than much farmyard manure. The soil should be made firm round the plants. Reduce the foliage to hasten ripening, but do not do so in large quantities at one time; do it by degrees.

Gathering Fruit. The fruit should be gathered while it is in the yellowish-green stage: it will then colour and ripen quickly off the plants.

Fruit Cracking. This is to some extent a matter of variety, some sorts being susceptible and others not: but it may also arise from irregular supplies of water, the skin hardening in drought, and the cortex swelling and rupturing the skin when abundant water in the form of rain or otherwise reaches the plants.

TOOLS AND APPLIANCES

An adequate supply of tools and appliances is essential to the proper management of a garden. Scarcely less important is the care of these articles. While this or that tool can be dispensed with in one particular garden or another, it is quite certain that few gardens of any size can dispense with the following:

Spade. A really good spade, light but of high-quality steel and therefore calculated to bear any reasonable strain, is invaluable. A heavy, clumsy, blunt tool doubles the work. With the spade there should be a scraper, which can be made at home. A Spear and Jackson Neverbend No. 3 spade meets the requirements of most people.

Fork. In our remarks on Digging, Bastard-trenching, and Soil, it was made clear that a fork is sometimes a more suitable tool for the occasion than a spade, and vice versa. Both tools should be available. If there has to be a sacrifice, the spade may go, and

a flat-tined Scotch fork with 4 prongs chosen, because it is a good tool for general digging and is also suitable for taking up manure and for lifting Potatoes. This is a rather heavy tool, and for light digging alone a round-tined fork may be preferred. The Neverbend forks are reliable.

Rake. An iron-toothed rake of 12 teeth, mounted on a strong ash handle, will meet general requirements, but in large places it is desirable to have also a 2-ft. heavy wooden rake with long handle, because it will be useful for crumbling heavy soil in addition to its more legitimate service with grass and hay.

Hoes. The hoe, known variously as flat, plate, and Dutch, in two sizes, 4-in. and 6-in., will be useful for shallow hoeing; but there should also be a swan-neck 5-in. or 6-in. draw hoe, as this will be useful for earthing Potatoes as well as for hoeing. On heavy soils a prong hoe, in some districts called a Canterbury hoe, will be valuable, both for breaking up clods and for earthing. A hand hoe is serviceable for work among Onions. Buco, Caxton, Planet, and other " Cultivators " are coming into favour for scarifying soil and while not essential certainly serve a purpose.

Pruning Implements. A medium-size stagshorn-handled pruning-knife with curved blade is indispensable if much pruning is to be done; there may even be two, one being of the sheath non-closing and the other of the closing type. A pair of secateurs, medium size (6½ or 7 in.), will also be useful. A pair of short-handled Gooseberry pruners will be helpful, and not for Gooseberries alone. With many large trees to deal with, a pair of pruners with 6-ft. handles will be necessary. In similar circumstances an 18-in. double-edged pruning-saw will do good work.

A medium-size budding-knife must not be forgotten if fruit trees or Rose stocks have to be budded.

Shears. A pair of 12-in. for hedges and of 3-ft. grass edgers will be required.

For Grass. See Grass, Mowers and Mowing, and Rollers.

Syringe, Sprayer. So far as small places are concerned, these can be in one, as represented by the Abol and other combined sprayers, which are provided with alternative nozzles, providing rose, jet, and spray: 18 in. by 1½ in. is a suitable size. For large cultures, knapsack or even larger sprayers will be needed.

Watercans and Barrows. The Haws Patent watercan in two sizes, 1 pint and 2 quarts, will meet most requirements. An 18-gallon water-barrow with wrought-iron frame and wheel will be valuable. For hose, Merryweather Armoured, Leyland Moulded, or Reliance Rubber Company Black Adder unkinkable, will serve.

Other tools and appliances may be:

Wheelbarrow	Billhook	Grasshook
Thermometer	Daisy extractor	Sharpening-hone
Trowel	Reel and pin	Trug basket
Besom	Powder bellows	Rain gauge
Scythe and stone	Edging-iron for grass	Dibber

A dry and well-ventilated tool store, with provision for suspending the tools and with oily waste available for cleaning, is important.

Top-dressing. A substitute for repotting. 2 ins. of the top soil is removed from the contents of a flower-pot, and fresh compost applied. Fruit and other trees, also shrubs, are often benefited by mulchings of fresh compost or manure.

Topiary Work. The pruning of trees and shrubs into fanciful or formal shapes. It is an old practice which has enjoyed a revival in recent years, but is not to be recommended for general adoption. Yew, Box, and Holly are the principal subjects.

Torch Lily. See Kniphofia.

Torch Thistle. See Cactus (Cereus).

Torenia (to-rē-nia. Ord. Scrophularineæ). Pretty hothouse herbaceous perennials, suitable for pots and hanging baskets. Asiatica, purple, summer, 1 ft.; flava (Bailloni), yellow, dark throat, summer, 1 ft.; and Fournieri, purple, blue, and yellow, summer, 1 ft., are the most popular species; there is a variety of the latter called compacta. Loam and peat in equal parts, with sand, suit. Propagation is by seeds in a warm house or frame in spring, or by cuttings.

Torreya, Fetid Yew (torrey-a. Ord. Coniferæ). A small genus of Conifers, handsome, but of unpleasant odour, particularly in the case of taxifolia, the Yew-leaved Stinking Cedar. Californica, grandis and nucifera are other species. All like a sheltered place. Ordinary friable soil. Propagation is by seeds sown in spring. Plant in spring.

Trachelium, Throatwort (trak-ē-lium. Ord. Campanulaceæ). The species caeruleum is a greenhouse herbaceous perennial, growing about 2 ft. high, with light blue flowers in summer and autumn; Album is a white variety. Loam, with sand and a fourth of leaf-mould, suits. Propagation is by seeds in a warm house or frame in spring, or by cuttings in spring; young plants should be stopped to induce a compact habit.

Trachycarpus (traky-cār-pus. Ord. Palmæ). Fan palms. Excelsa (Fortunei) is the same as Chamaerops humilis, and may be grown outdoors in mild, sheltered places only. Martiana should be kept in a greenhouse. Loam, with sand and a third of peat, suits. Propagation is by seeds in heat.

Tradescantia, Spiderwort (trăd-es-căn-tia. Ord. Commelinaceæ). Vigorous herbaceous perennials, one of which, zebrina (Zebrina pendula), is favoured for hanging baskets; it may be grown in pots stood in ornamental vases in rooms; its foliage is prettily striped, and its habit pendulous; if given sufficient water it grows luxuriantly, and forms a new shoot at every broken tip; it may therefore be propagated readily by cuttings. Reginae also has pretty leaves. Virginiana (virginica) is the popular hardy Spiderwort; it grows about 1 ft. high, and has blue flowers in spring; there are several varieties, including a white and a double. They will thrive in ordinary soil, and are propagated by division in spring.

Tragopogon, Goat's Beard (trăgo-pō-gon. Ord. Compositæ). Porrifolium is the Salsify, which see. Pratensis is the common Shepherd's Clock. Both are biennials, with yellow flowers in late spring. Ordinary soil. Propagation by seed in spring.

Transpiration. The passage of water from the leaves of plants in the form of vapour. See a modern work on Botany.

Traveller's Joy. See Clematis Vitalba.

Tree Ivy. This is Hedera arborea, of which chrysophylla and elegantissima, sometimes grown as standards, are varieties. See Ivy.

Tree Mallow. See Lavatera arborea.

Tree of Heaven. See Ailanthus glandulosus.

Tree Paeony. See Paeony.

Trees. What are known as park or forest trees are not wanted in small gardens, because they deprive plants of sun and food. But room should be found for a few ornamental trees, selected from Copper Beech, variegated Maple (Acer Negundo variegata), Tree of Heaven (Ailanthus glandulosus), crimson and white Thorns, Laburnum, Tulip Tree (Liriodendron), Magnolia, Purple-leaved Plum, Robinia, Almond, and Lilac. It is rare to see any of these approaching the dimensions of the park trees, unless it is the Copper Beech; but all have beautiful flowers or foliage to recommend them.

The evergreen cone-bearing trees (Conifers) are excellent for the flower garden, because of their compact growth, graceful form, and handsome leafage. The Cedar (Cedrus), Juniper, Cypress (Cupressus), Pines and Firs (Abies, Picea, and Pinus), Monkey Puzzle, Larch (Larix), Wellingtonia, Yew (Taxus), Maidenhair Tree (Ginkgo), and Thuya are familiar examples. Conifers should not be set amongst shrubs, but given isolated positions. Standard Thorns, Laburnums, Purple-leaved Plum, Rowan or Mountain Ash, False Acacia, and Almond may, however, be planted abundantly in shrubberies to break up the uniformity. In this connection, too, the fruit genera may be considered. Pyrus floribunda, P. spectabilis and P. Scheideckeri are beautiful trees, and so is the Bird Cherry. If a large, fast-growing tree is wanted for a boundary, the Lombardy Poplar might be considered; if planted a yard apart and the heads pruned at about 10 ft. high they soon make a screen.

The principal trees of all classes are dealt with under their own names throughout the book. To calculate the capacity of timber in cubic feet take a quarter of the girth at the centre of the tree and deduct 1¼ ins. for the bark. Multiply the quotient by the length of the bole in feet.

Trefoil. See Trifolium.

Trellis. Expanding wooden trellis, which ironmongers and seedsmen supply, is useful for forming screens and shelters quickly. It should be covered with climbers as speedily as possible, to take off the stiffness. The trellis should be secured to strong uprights, and should be painted green or creosoted.

Trenching. See remarks under Bastard-trenching.

Trichinium (trī-kin-ium. Ord. Amarantaceæ). The species Manglesi is a charming little greenhouse perennial with fluffy pink flowers in June, height 9 ins. It likes loam and peat in equal parts, with sand. Propagation is by seeds or root cuttings with heat in spring.

Trichomanes, Bristle Fern (trī-kŏm-an-ēs. Ord. Filices). Beautiful ferns, one of the most popular of which is radicans, the Killarney Fern, a wilding in Ireland; Andrewsii, crispum, and dilatatum are varieties of it. They like a humid atmosphere, with shade. Fibrous peat suits them, over abundance of drainage. See also Ferns.

Tricuspidaria (trī-cus-pi-dā-ria. Ord. Tiliaceæ). The species dependens, with pendulous white fringed flowers in spring, 4–6 ft. high; and lanceolata (Crinodendron Hookerianum), with drooping coral-red

flowers in spring, 4–6 ft., are beautiful evergreen shrubs, requiring a wall, or a sheltered position on a large rockery, except in mild districts. They do best in peat and loam. Propagation is by cuttings in sandy soil under a handlight in summer. Plant in spring.

Tricyrtis (trī-cer-tis. Ord. Liliaceæ). The most popular species is hirta, a hardy herbaceous perennial, with white, purple-spotted flowers in autumn, height about 2 ft. It thrives in sandy soil on the rockery, and is propagated by division in spring.

Trientalis, Wintergreen (trī-en-tā-lis. Ord. Primulaceæ). A small genus of hardy herbaceous perennials, suitable for a shady part of the rockery, in loamy soil. Americana and europaea both have white flowers in summer, and grow about 9 ins. high. Propagation is by seed or division under glass in spring.

Trifolium, Trefoil, Clover (trī-fō-lium. Ord. Leguminosæ). The Clovers are, of course, more important as farm than as garden plants, but one or two are good enough for the rockery, notably alpinum, pink; and pannonicum, yellow and white, both early summer bloomers. Hybridum is the Alsike, and repens the white Clover; the latter is often used as Shamrock, although the yellow suckling, minus, has perhaps better claims. They grow in ordinary soil, and are propagated by seed in spring.

Trillium, American Wood Lily (trĭll-ium. Ord. Liliaceæ). The species grandiflorum is a beautiful and distinct plant, admirably adapted for cool, shady positions in the woodland or wild garden. The flowers are large and pure white, borne in May; height 9 ins. The bulbs may be planted 2 ins. deep and 6 ins. apart in autumn. Other species are erectum, purplish red, 1 ft.; erythrocarpum (undulatum) red-fruited, 6 ins.; recurvatum, marbled leaves, 1 ft., and stylosum, rose, 1 ft.

Triteleia (trī-tel-ī-a, commonly trī-tē-le-a. Ord. Liliaceæ). These bulbs are now included with Brodiaeas by botanists. They are pretty dwarf bulbs, blooming in spring, good for rockeries and the front of borders. Uniflora is the best-known species; the white flowers are delicately suffused with lilac and have a pleasant perfume; violacea is a darker variety. They may be planted 2 ins. deep and 6 ins. apart in autumn, or grown 3 in a pot, and treated like other indoor bulbs, for flowering in winter under glass.

Triticum, Wheat, Couch (trĭt-ĭ-cum. Ord. Gramineæ). This genus includes a beneficent plant in vulgare, the Wheat Plant; and a troublesome one in repens. See Couch Grass.

Tritoma. See Kniphofia.

Tritonia, Crocosma (trī-tō-nia. Ord. Irideæ). The species aurea, which bears long, graceful racemes of orange-coloured flowers in summer, is a bright and popular plant. It is hardy in warm, sunny spots, and in well-drained, friable soil. It is well worth growing in pots for the cool greenhouse, and may be given the general bulb treatment; see Bulbs. Crocata is also an orange-coloured species.

Trochodendron (trō-kō-den-dron. Ord. Trochodendraceæ). The only species is aralioides, a semi-hardy evergreen shrub with Aralia-like leaves and greenish flowers in spring, height 4 to 6 ft. It likes peaty soil. Propagation is by layers in autumn. Plant in spring.

Trollius, Globe Flower (trŏll-ius. Ord. Ranunculaceæ). Useful hardy herbaceous plants, with bright yellow or orange flowers in spring.

Asiaticus has deep yellow and europaeus pale yellow flowers in late spring or early summer, height about 18 ins. There are several varieties of both; aurantiacus, orange yellow, japonicus (Fortunei) and double form, and Orange Globe are forms of asiaticus. Albidus, Newry Giant, superbus, and flore pleno are forms of europaeus. Pumilus, yellow, 1 ft., is a dwarf species. They will grow in most soils, but like a moist clayey or boggy mould. Propagation is by division in autumn.

Tropaeolum, Indian Cress, Garden Nasturtium (trō-pae-ō-lum. Ord. Geraniaceæ). As is stated under Nasturtium, that generic name belongs to the Water Cress, and the garden Nasturtiums are really Tropaeolums. The genus is a large one, and includes both hardy and tender, annual and perennial, species. Aduncum (canariense, peregrinum) is the Canary Creeper, a nearly hardy annual raised from seed in a greenhouse or frame in spring. Azureum is a greenhouse perennial, blue, autumn bloomer; grandiflorum is a large variety of it. Jarrattii is also a greenhouse perennial, with orange flowers. Lobbianum is a scarlet greenhouse annual; there are many varieties, of which Brilliant and Firefly are good. Majus and minus are the tall and dwarf hardy annual Nasturtiums respectively (see Nasturtiums and Annuals). Polyphyllum is a prostrate tuberous-rooted hardy perennial with yellow flowers and silvery foliage. An exceedingly beautiful plant, it should be planted 9 ins. deep in a sunny spot in the rockery. Speciosum is the beautiful Flame Nasturtium, a hardy perennial, which thrives in Scotland and the Lake District of England, and in cool places in southern England. It will not endure hot sun and dry soil, but must have semi-shade and cool soil. It likes peat. Tricolorum is a hardy perennial with scarlet and orange flowers. The tuberous-rooted species should be lifted and stored in autumn; they may be propagated by division. The annuals are raised from seed in spring. All thrive in friable loam.

Trowel. A useful transplanting tool, with which plants can be shifted without shaking the soil from the roots.

Truffles. An edible fungus, growing beneath the surface of the soil, often in the shade of Beech trees, and found with the aid of small trained dogs.

Trumpet Creeper. See Tecoma.

Trumpet Flower. See Bignonia.

Trumpet Honeysuckle. See Lonicera sempervirens.

Truss. An umbel of flowers, each flower-stem springing from a common centre.

Tsuga (tsū-ga. Ord. Coniferæ). Hardy evergreens. Canadensis (Abies, Picea, and Pinus canadensis) is the Hemlock Spruce; there are many garden varieties, of which a few of the best are albo-spica, white-tipped; gracilis, drooping; and nana, dwarf. Hookeriana, Mertensiana (Abies Albertiana and Mertensiana), and Pattoniana, the Californian Hemlock Spruce, are also popular kinds. The culture is the same as for Pines; see Pinus.

Tuber. A fleshy underground stem containing buds, e.g. the Potato.

Tuberose (Polianthes tuberosa). A fragrant, pure white bulbous flower, with long flower-stems, which rise in summer. The bulbs are procurable in winter and spring, and should be potted singly like

Hyacinths and given the general bulb treatment; see Bulbs. They are quite easy to manage. The favourite variety Pearl has double, fragrant flowers. Charming for bouquets, wreaths and general cut-flower work.

Tulip, Tulipa (tū-li-pa. Ord. Liliaceæ). The Tulip grows rapidly in favour every year as a garden flower, and runs the Daffodil an increasingly hard race for supremacy. Its great value lies in the fact that by making a choice of varieties we can have Tulips in bloom from mid-April to June. Moreover, we can have plants with flower-stems 1 ft. high and varieties 3 ft. high. Few flowers have a wider range of colours than the Tulip, but it does not give us blue.

Pot Culture. The early Dutch varieties, beginning with the Duc van Thols, are the most suitable. Pot 3 to 5 bulbs in a 5-in. or 6-in. pot, using a compost of 3 parts fibrous loam, 1 leafmould or decayed manure, and sand, and plunge in coco-nut-fibre refuse for a few weeks, withdrawing when the tips are about 1 in. high. The plants sometimes throw abortive flowers, but this rarely happens with large, well-ripened bulbs, unless there has been a serious error in culture, such as keeping the plants too long in fibre, forcing them too hard, or giving insufficient water.

Culture in Fibre. The early Dutch, equally with the late Cottage and Darwin Tulips, can be grown admirably in the prepared fibre sold by bulb-dealers if it is thoroughly moistened through and through at the start, and the bowls are kept in the dark for 6 to 8 weeks afterwards. It may be remarked that British-grown Tulips are quite as good as Dutch, and the buyer must not be alarmed by their loose skins, which do not affect the flowering.

After Flowering. Tulips differ from Hyacinths in bulbing freely after flowering, and consequently any good varieties should be kept. If the soil is good, and the season not a very dry one, they are sometimes better the second year than the first.

May Tulips. The Cottage and Darwin Tulips make grand beds, there are plenty of annuals (see Annuals), which may be raised in readiness for planting out in June, so that no one need hesitate to plant late Tulips freely on the ground that they occupy the beds too long. For hints on the use of Tulips with other plants in beds, see Beds and Bedding-out. They make noble colour groups in borders.

The following are beautiful early Dutch single Tulips, suitable for pots, bowls, and beds:

Brunnhilde, flamed buff
Chrysolora, yellow
Cottage Maid, pink, dwarf
Couleur de Cardinal, cardinal
Duc van Thol, red and yellow, also other colours
Dussart, crimson
Hector, carmine
Joost van Vondel, striped, also white form
Keizer's Kroon, red and yellow
La Boule d'Or, yellow
Le Rêve, lilac
Ophir d'Or, yellow
Pink Beauty, rose and white
Pottebaker, white
,, yellow
Prince de Ligny, yellow
Proserpine, yellow
Rose Luisante, rose
Thomas Moore, orange
Van der Neer, purple mauve
Vermilion Brilliant, scarlet
White Swan, white

The following are good early double or semi-double varieties:

Blanche Hâtive, white
La Candeur, white
Lord Beaconsfield, cerise
Reine des Roses, rose
Rex Rubrorum, red
Salvator Rosa, rose
Tournesol, red and yellow
„ yellow
Yellow Rose, sweet

The Parrot Tulips should also be borne in mind.

The following are splendid May bloomers:

Baronne de la Tonnaye, crimson, purple edge
Beethoven, lilac rose
Bouton d'Or, deep yellow
Caledonia, cardinal
Clara Butt, salmon rose
Erguste, heliotrope
Fire Flame, smoky rose, mid-season
Gesneriana lutea, yellow
„ major, scarlet
Inglescombe Pink
„ Yellow
La Merveille, coppery, sweet
La Tulipe Noire, purple
Le Rêve, mauve
Loveliness, lilac pink
Maiden's Blush, white, rose edge
Margaret (Gretchen), pale pink
Mrs. Krelage, mauve, white edge
Mrs. Moon, yellow
Orange King, orange
Pride of Haarlem, crimson
Rev. H. Ewbank, lilac
Sensation, bronze
Summer Beauty, rose flake
Sunset, apricot
The Sultan, maroon
Unique, white with yellow flame, resembling Brunnhilde
Velvet King, plum colour
Walter T. Ware, orange

Tulips are, however, being actively developed by florists, and new varieties appear frequently. See exhibits at shows and displays in nurseries and public gardens.

Tulip Tree. See Liriodendron.

Tunica Saxifraga (tū-ni-ca. Ord. Caryophylleæ). A pretty hardy perennial for the rockery, with white flowers in summer; height 3 ins. Alba plena is a double white form. They like sandy loam. Propagation is by seed in spring.

Turban. See Ranunculus.

Turf. See Grass and Lawn.

Turkey Oak. See Oak and Quercus Cerris.

Turk's Cap Lily. See Lilium Martagon.

Turnip (Brassica Rapa). A useful vegetable, well adapted for culture as a " catch crop " between Peas, but also suitable for being sown in beds. Coming into use in 6 or 8 weeks from sowing, Turnips are handy for coming between two long-season crops. They may, for instance, be sown in late summer on ground from which a crop has been cleared, and give produce the same autumn. The soil need not be heavily manured, but it should be raked fine and the seed sown ½ in. deep; 1 oz. should sow 200 ft. in lines. Outdoor sowings may begin in sheltered spots in February if the ground is dry enough, and continue until September.

Flea Beetle. The crops may fail in hot, dry weather, especially if they are attacked by the flea beetle (Haltica or Phyllotreta nemorum), which riddles the leaves. A good remedy is to roll or tread the bed as soon as the young plants come through, and this

may be supplemented by dusting early in the morning with dead soot or wood ashes.

Varieties. It is advisable to choose varieties according to the soil and season of sowing. Thus one of the best for early sowings is Early Milan, and this should be followed by Snowball or Model, which may be sown again in August, but should not be sown in summer except in cool, moist districts. Two of the best hot-weather varieties are Red Globe and Green Round. A suitable sort for sowing in autumn is Chirk Castle, as it is very hardy.

Gall-weevil. This pest sometimes attacks Turnips; see remarks on gas-lime under Broccoli.

Garden Swedes, such as Purpletop, both white- and yellow-fleshed; and Greentop, both white- and yellow-fleshed, are sometimes sown at the end of June alternatively to Turnips.

Tussilago Farfara, Coltsfoot (tussil-ā-go. Ord. Compositæ). A troublesome weed in gardens, with broad, thick, round leaves and yellow flowers in spring; it should be kept under strict subjection. The Winter Heliotrope, Tussilago fragrans, is now called Petasites fragrans; see Petasites.

Tutsan. See Hypericum Androsaemum.

Typha, Bulrush, Cat-o'-nine-tails, Reed Mace (tŷ-pha. Ord. Typhaceæ). Aquatics, of which latifolia, the British Reed Mace, has long, reddish spikes in summer. Angustifolia is smaller. Both may be cut early for winter decoration. They like marshy ground, and may be propagated by division in spring.

U

Ulex, Furze, Gorse, Whin (ū-lex. Ord. Leguminosæ). Hardy evergreens, with spiny foliage, well suited to growing on sandy heaths, in bloom for many months. Europaeus is the popular species; flore pleno is a double form of it; strictus, another variety, is the Irish Furze. Nanus is a small species, yellow-flowered like the others. The common Furze is raised from seed in spring. Flore pleno and erectus are propagated by cuttings in a frame in autumn.

Ulmus, Elm (ūl-mus. Ord. Urticaceæ). See Elm.

Umbel. An inflorescence in which the stalklets (pedicels) all spring from the same point on the stalk, and all the flowers are borne at the same level, as in the Cowslip. In a compound umbel the pedicels themselves branch and repeat the arrangement, as in the Carrot.

Umbilicus. See Cotyledon.

Umbrella Pine. See Sciadopitys verticillata.

Umbrella Plant. See Saxifraga peltata.

Underground Onion. See Onion.

Urceocharis Clibrani (ūr-cē-ōk-ar-is. Ord. Amaryllideæ). A hybrid between Eucharis grandiflora and Urceolina pendula, with white drooping flowers in spring and summer, height 18 ins. For culture, see Eucharis.

Urceolina pendula (ūr-ceo-lī-na. Ord. Amaryllideæ). A pretty greenhouse bulb, with drooping umbels of yellow and green flowers in early summer. Loam and leaf soil in equal parts, with sand, suit. Propagation is by offsets while dormant.

Ursinia. As mentioned under Sphenogyne (which see), the annual offered by seedsmen as Sphenogyne speciosa is really Ursinia pulchra or speciosa. U. anethoides, orange, 1 ft., is good either as a garden or pot plant.

Utricularia, Bladderwort (ū-tric-ū-lā-ria. Ord. Lentibularieæ). An interesting genus, embracing aquatic species provided with small pitchers, which capture and feed on small insects. Montana, with white and yellow flowers in summer, height 6 ins., is the best known. It may be grown in Sphagnum moss and fibrous peat in a hanging basket in a warm house so long as it is provided with large quantities of water. Propagation is by division while dormant.

V

Vaccinium, Bilberry, Cranberry, Blackberry, Huckleberry, Whortleberry (văc-cĭn-ium. Ord. Vacciniaceæ). A large genus of hardy shrubs and small trees, producing edible berries. Corymbosum, white flowers and bluish-black berries; Myrtillus, rose flowers and blue fruits, the Bilberry, Blaeberry, or Whortleberry; and Vitis-Idaea, pink flowers and red fruits, the Cowberry or Flowering Box, are the best known, but they are not widely grown in gardens. All are deciduous except the last, which is evergreen. They thrive in sandy peat. Propagation is by seed in spring.

Valerian, Greek. See Polemonium caeruleum.

Valerian, Red. See Centranthus ruber.

Valerian, Spur. See Centranthus macrosiphon.

Valeriana, Valerian (va-lē-ri-ā-na. Ord. Valerianeæ). Closely allied to Centranthus. Dioica, rose, is the Marsh Valerian, and officinalis, pink, the Common Valerian or Allheal. They flower in summer. Ordinary soil. Propagation by seed or division.

Vallisneria (vallis-nē-ria. Ord. Hydrocharideæ). The species spiralis is an interesting half-hardy aquatic, with grass-like leaves and white flowers in summer. The system of fertilisation is unusual. The male flowers are at the base of the plant, in the water, from which they rise to the surface. The female flowers come to the surface when ready for fertilisation, after which process they are drawn back to the bottom of the water by the spiral contraction of the stems. The plant may be grown in a tub in a winter temperature of about 45°. Propagation is by seeds or division.

Vallota, Scarborough Lily (val-ō-ta. Ord. Amaryllideæ). The species purpurea (Amaryllis purpurea) is a popular greenhouse bulb, with bright red flowers in summer, height 18 ins. It makes a nice greenhouse or window plant. It should be potted, when necessary, in early summer, in equal parts of loam and leafmould, with a good deal of sand, but annual repotting should be avoided; it is better to top-dress and give liquid manure. Propagation is by offsets. Magnifica and major are large varieties. A great deal of water will be needed in summer.

Vancouveria, Barrenwort (van-cōū-vē-ria. Ord. Berberideæ). The species hexandra is a graceful hardy herbaceous perennial with blush flowers in May, height 15 ins. Its ferny foliage is very attractive. Sibirica, white, is also offered. They like peat and a shady corner of the rockery. Propagation is by division in autumn or spring.

Vanda (văn-da. Ord. Orchidaceæ). A large genus of hothouse Orchids, mostly with erect stems, thick, recurved leaves, and flowers in racemes. Caerulea is a beautiful species, with large pale blue flowers in autumn, height 2 to 3 ft.; Fowleriana is a fine variety of it. Sanderiana, pink, yellow, and crimson, 3 ft., summer, immense flowers,

is a splendid plant, of which albata is a good white ground variety. Suavis, various colours, 6 to 8 ft., autumn, is very fragrant; Chatsworth, flava, and rubra are three varieties. Teres, white, rose, and magenta, 3 to 6 ft., spring, is popular. Other good species are Amesiana, insignis, Kimballiana, and tricolor. They like a mixture of fibrous peat and Sphagnum over abundance of crocks. They enjoy shade when making their growth, except teres, and likewise abundance of root and atmospheric moisture; little water should be given when growth is complete. Propagation is by basal growths, with roots attached. There are several hybrid Vandas, for which see a modern work on Orchids.

Vaporite. A valuable soil disinfectant, suitable for use in late winter or early spring at the rate of 2 lb. per rod. Its use is recommended under various plants in this work.

Vegetable Marrow (Cucurbita ovifera). The majority of people enjoy Vegetable Marrows as a variant on Peas and Beans in summer, and there is rarely much difficulty in getting a good supply, as the plant is easily grown. The one serious trouble is the falling of the fruit at an early stage, and that is due to faulty pollination, consequent on wet weather. It is not common, and can be remedied by placing the non-fruit-bearing flowers in contact with the fruit-bearers when the pollen is ripe. Where an early crop is wanted seed should be sown in February in a warm house or heated frame, the seed being laid flat and pressed firmly into the soil, and the plants subsequently hardened in a cold frame.

Planting. They may be planted out early in May if the locality is a mild one and the place sheltered; but mid-May is early enough in exposed places, and even then something should be kept at hand for putting over them on cold nights. With bush Marrows, 4 ft. apart will not be too close; but if running varieties are used the plants had better be given 12 ft. Speaking generally, the bush Marrows crop earlier than the runners. Some growers make small pits, which they fill up with garden refuse and manure, planting the Marrows on the top. The plan is not to be recommended, as in wet seasons there is great trouble from fruit-dropping. A barrowful of soil placed on a heap of manure will generally ensure vigorous growth and a heavy crop. With well-done ground in a good kitchen garden, Vegetable Marrows require nothing beyond plain soil. The plants may be put between early Peas, and can be allowed to spread over the ground when the Peas are cleared; or can be set in Spring Cabbages where some of the Cabbages have been cut.

Varieties. Long White, Long Green, Green Bush, Custard and Pen-y-Byd are popular varieties. See also seedsmen's specialities.

Stopping. It is not common to stop or pinch Vegetable Marrows, but if the main vines are stopped at about 6 ft. laterals will form more freely and the flowers on these set better than those on the mains.

VEGETABLES: CROPPING PLANS—USEFUL TABLES—INTENSIVE CULTURE

All the most useful vegetables are dealt with under their own names throughout the book, but it may be useful to make a few general remarks on Vegetables and also to give some tables.

Planning a Kitchen Garden : Paths. In planning a kitchen garden we are under compulsion to pursue the simplicity of rectangles, but straight paths and beds need not be regretted, because beside the main walks we can allow wide borders in which herbaceous plants can be tastefully grouped, thus making the kitchen garden bright and attractive. In making preliminary provision for paths, the area of the garden may be taken into consideration. The more path, the less garden. The longer and wider the paths, the greater the cost, as a made path is much more expensive than a dug border. The fewer and smaller the paths, therefore, the lower is the ratio of expenditure and the greater the amount of space available for crops. In kitchen gardens up to, say, an acre in area it will suffice if the main paths are 1 yd. wide. Only in large gardens need they be made wide enough to allow the passage of a cart. The transport of manure is not likely to be so considerable in smaller gardens as to call for anything larger than a wheelbarrow. The most convenient arrangement of paths is that in which a continuous path is taken all round the outside, while two central intersecting paths divide the main area into 4 quarters. This permits of quick and easy access to every part. The outside path should not closely skirt the wall, hedge, or whatever other boundary may exist, but should be laid down 10 or even 20 ft. from it, in order to provide a border, which will be useful for small crops and save cutting up the main areas into very small portions. By providing rows as long as possible for the principal crops, tools, and still more mechanical Cultivators, can be used to the greatest advantage. The economical amateur may well shy at the cost of gravel paths, which, from the labour, drainage, and material that they demand, are very expensive. And while they are desirable they are by no means indispensable. Paths stamped out of the ordinary earth after the soil has been loosened and levelled and sprinkled with ashes will serve; a watering with weed killer twice a year will keep them clean. It is for each garden-maker to decide for himself whether they adequately provide the required amenities, or whether a properly made path is called for.

Planning : Shelter. We come, then, to an intelligible scheme: border and adjoining path all round the garden, central paths running (1) east and west, (2) north and south, 4 main quarters. Such an arrangement will ensure rapid construction and convenient working. If a shelter, whether of wall, hedge, or belt of trees or shrubs, can be provided along the north and east boundaries, the borders which they protect, and which of course face south and west respectively, will give early produce. The gardener's "south border" is the favoured place for early Potatoes, Peas, Lettuces, Radishes, and other garden delicacies.

Planning : Site and Area. If there is a choice of sites, let that be chosen which provides a gentle southern slope, because it is likely to be well drained as well as warm. If the site is at water-level and the soil stiff, it is desirable to lay drain-pipes, which may be 2½ ft. below the surface in trenches 15 ft. apart, the water being taken to any existing outlet, such as a ditch or stream; and failing a vent, to a pool on the premises. In the case of a small piece of ground, an oblong is better than a square, because it permits of longer rows;

it is best if it runs as nearly as possible east and west, because then the rows, running north and south across it, get the unobstructed light and heat of the sun. An acre of ground, which if square would measure approximately 70 yards along each of the 4 sides, would be ample to supply a household of 10 persons with vegetables throughout the year and in addition would yield fruit and flowers. But such an area would call for an average of 5 hours' labour per day. A quarter of an acre may be considered the maximum amount of ground which can be cultivated in a workmanlike way in the ordinary leisure of an amateur gardener. It would yield enough vegetables for a household of 6 persons throughout the year. An eighth of an acre would be enough for many families. A sixteenth (see cropping plans hereafter) is very useful.

Selections of Crops. What crops can we grow? We can grow every crop which we resolve to grow, but we cannot grow all with equal ease and success in every kind of soil; and if we want to sell we shall have to exercise restraint. It is rarely possible to sell to advantage surpluses of Parsnips, Beetroot, Turnips, late Potatoes, late Cabbages, Brussels Sprouts and other greens, Leeks, late Peas, and Broad Beans. It is more easy to sell French and runner Beans, Lettuces, Radishes, early Cabbages, early Cauliflowers, early Potatoes, young Onions, and Tomatoes profitably; and all these are welcome on the table at home. In small cultures, crops of inconsiderable weight and bulk which occupy the ground for a short period only, and can therefore be " turned over " at a minimum of labour and expense, pay best. Let us form a definite idea of the principal object, so that we may not fall between two stools. Does the home stand first? Then the course is clear—it is to proceed forthwith to the formation of a scheme that shall produce the longest possible supply of the vegetables most esteemed. Amongst the indispensables there will probably in most households be placed Potatoes, kidney Beans, Peas, early Cabbages, Cauliflowers, early Carrots, Celery, Lettuces, Mustard and Cress, Onions, Radishes, and Brussels Sprouts. How these things can be interwoven with each other we shall see. In a second class will probably be placed Broad Beans, Beetroot, Rhubarb, Parsnips, Broccoli, Asparagus, Savoys, Spinach, Tomatoes, Turnips, and Vegetable Marrows. In the third class will be put winter Kale, summer Cabbages, Leeks, and Seakale. This classification does not necessarily indicate the tastes of the author, but is an attempt to estimate the preferences of the majority. But whether the various items are valued as first, second, or third class, suggestions for dealing with them as factors in cropping schemes shall be given.

When to Start. The best period to start vegetable-growing is the period when most people leave off, namely, autumn, because any rubbish on the ground can be burned, manure and leafmould can be collected, digging and trenching can be done, Peas, Broad Beans, Spinach, and Turnips can be sown, Cabbages, Lettuces, winter greens, Onions, and fruit can be planted. All this means a considerable contribution to the success of the coming year. The soil-preparation can be pursued as the weather permits throughout the winter, but not the sowing and planting. The amateurish method of leaving everything till Easter cannot be recommended. Moon-

light nights in winter should be made use of if the cultivator is in great straits for time during daylight.

The next best time to autumn in the case of most soils and districts is late winter. The worst of the rains are probably over; frost has got into the ground and made it crisp, so that it digs well; manure can be shifted about easily while the ground is hard with frost; fruit trees can be planted when the ground is unfrozen; Broad Beans, early Peas, Turnips, and Radishes can be sown; rubbish can be burned while dry and added to the soil. These make up a substantial list of advantages. With a dry February or March all the work of the season can be got in hand and the whole situation mastered for the year. If a start cannot be made till the end of the spring, the grower will be behind his work and will be well advised to reduce the number of crops grown. He can still plant Potatoes and sow Carrots, Peas, kidney Beans, Beetroot, Lettuces, and other salads, Broccoli, Vegetable Marrows, and Coleworts. He can buy plants of winter greens of all kinds, autumn Cauliflowers, Tomatoes, Celery, Onions, and Leeks. These will give him a very good range of useful crops. In August he can sow spring Cabbages, Lettuces, Turnips, Swedes, winter Spinach, Cauliflowers (preferably under glass), and Onions; and he can plant Savoys, Broccoli, Celery, and winter Kale. The person who knows that he cannot start until late in spring may ease the situation by sowing a few important things in a frame in late winter. Cauliflowers, Peas, Celery, Leeks, Tomatoes, Vegetable Marrows, Lettuces, Onions, and Brussels Sprouts are all amenable. Potatoes can be started in boxes.

Useful Tables. As the vegetable grower is apt to forget the times of sowing his crops, the distance to which to thin the plants, and other important matters, we may at this stage introduce the following tables as reminders:

I. TRANSPLANTED VEGETABLES

Kind	*When to sow*	*When to plant out*	*Distance apart in inches*		*Depth to sow in inches*	*Fair period for germination in days*	*Time of maturing in weeks*
			rows	*plants*			
Borecole (Kale)	April outdoors	June	30	30	½	9	30–36
Broccoli	March–May	June	30	30	½	9	30–36
Brussels Sprouts	April	June	36	36	½	9	30–36
Cabbages for spring	Early August outdoors	October	18	18	½	7	36
,, ,, autumn	Late spring outdoors	May or June	24	24	½	8	18–20
Cauliflowers, summer	Winter under glass	April	24	24	½	7	20
,, autumn	April outdoors	June or July	36	30	½	9	30
Celery, early	Winter in heat	May	36	9	½	12	28
,, late	Spring under glass	June or July	48	12	½	14	36
Cucumbers, indoor	Winter in heat	Winter under glass	—	24	1	8	6
,, outdoor	Spring under glass	June or July	48	48	1	10	20
Endive, late	August outdoors	September	15	15	½	8	36
,, early	Spring in frame or outdoors	May or June	15	15	½	9	12
Leeks, early	Winter in heat	April or May	24	6	½	8	25
,, late	Spring in frame or outdoors	June or July	24	6	½	9	36
Lettuces, summer	Spring in frame or outdoors	April to June	12	12	½	7	12
,, spring	August outdoors	October or April	12	12	½	8	36
Onions, large bulbs	Winter under glass	April or May	18	18	½	7	25
Savoys	April, May	June–July	30	30	½	9	30–36
Tomatoes, indoor	Winter in heat	Winter under glass	30	12	½	8	12–15
,, outdoor	Spring under glass	June or July	30	12	½	9	16–18
Vegetable Marrows:							
running	Spring under glass	June or July	72	72	1	9	16–18
bush	Spring under glass	May or June	36	36	1	9	12–15

II. NON-TRANSPLANTED VEGETABLES

Kind	*When to sow or plant*	*Distance apart in inches*		*Depth to sow in inches*	*Fair period for germination in days*	*Time of maturing in weeks*
		rows	*plants*			
Artichokes, Jerusalem	April	72	12	6	14	30–40
Asparagus (seed)	April	12	1	1	10	Can be cut in 3rd year
,, (crowns)	April	24	18	4	—	Can be cut in 2nd year
Beans, Broad	November and March	24	8	3	8–12	Autumn-sown, 28, spring,
,, dwarf French	May	24	8	2	10	10–12 [15
,, Runner	May	72	12	3	10	10–12
Beetroot	May	12	9	2	9	20
Carrots	April to June	15	6	1	10–14	20–24
Onions	March, April, and August	9	3	1	9	20
Parsnips	March or April	12	9	1	15	30–40
Peas, early dwarf	March	18	1	3	10–12	13–16
,, early tall	March	48–60	1	3	10–12	13–16
,, late tall	April and May	60–72	1	3	8–10	12–15
Potatoes, early	March	24	12	4–6	18–25	12–15
,, late	April	36	15	4–6	18–25	15–20
Radishes	March onwards	broad-cast	—	1	6	4–6
Rhubarb (crowns)	March or April	48	36	4	—	Can be pulled in 2nd year
Seakale (crowns)	April	24	24	4	—	Can be forced in 2nd year
Shallots	February or March	12	9	half bury	—	16
Spinach	Spring to late summer	12	9	1	8–10	18–30
Turnips	Spring to late summer	12	6 (or broad-cast)	½	6–8	6–8

How to Crop a Small Vegetable Garden: Objectives. To provide a family of six with the following:

(1) 3 lb. Potatoes, or ½ lb. per head, for every day in the year.
(2) A dish of Green Vegetables every day in the year.
(3) A supply of Beetroot, Carrots, Celery, Leeks, Onions, Parsnips, and Turnips for at lest six months.
(4) A good supply of Beans, Peas, Rhubarb, Salads, Tomatoes, and Vegetable Marrows in their seasons.
(5) Useful pickings of culinary Herbs.

The complete list of crops is as follows:

Beans, Broad	Lettuces (spring)
Beans, Dwarf French	Onions
Beans, Scarlet Runner	Parsnips
Beetroot	Peas
Borecole	Potatoes
Broccoli	Radishes
Brussels Sprouts	Rhubarb
Cabbages for Spring	Savoys
Carrots	Shallots
Cauliflowers	Spinach, Perpetual
Celery	Tomatoes
Leeks	Turnips
Lettuces (summer)	Vegetable Marrows

In addition there may be such Herbs as Mint, Sage, and Thyme, and there may be Parsley.

For times and distances of sowing and planting, with other details, see the preceding tables and the remarks on the different vegetables in their places throughout the book.

Intensive Culture. To obtain so many kinds from a small area of ground admittedly calls for careful planning. Several crops will have to occupy the same section of ground within the year, some simultaneously, others successionally. In fact INTENSIVE CULTURE will be necessary.

In order to show with the utmost clearness how this can be pursued to the greatest advantage, a series of six plans has been prepared. The first three show the plot in the first year at the following periods:

Plan I. March to July inclusive.
Plan II. August to October inclusive.
Plan III. November to February inclusive.

The remaining three Plans show the plot at the same periods in the second year.

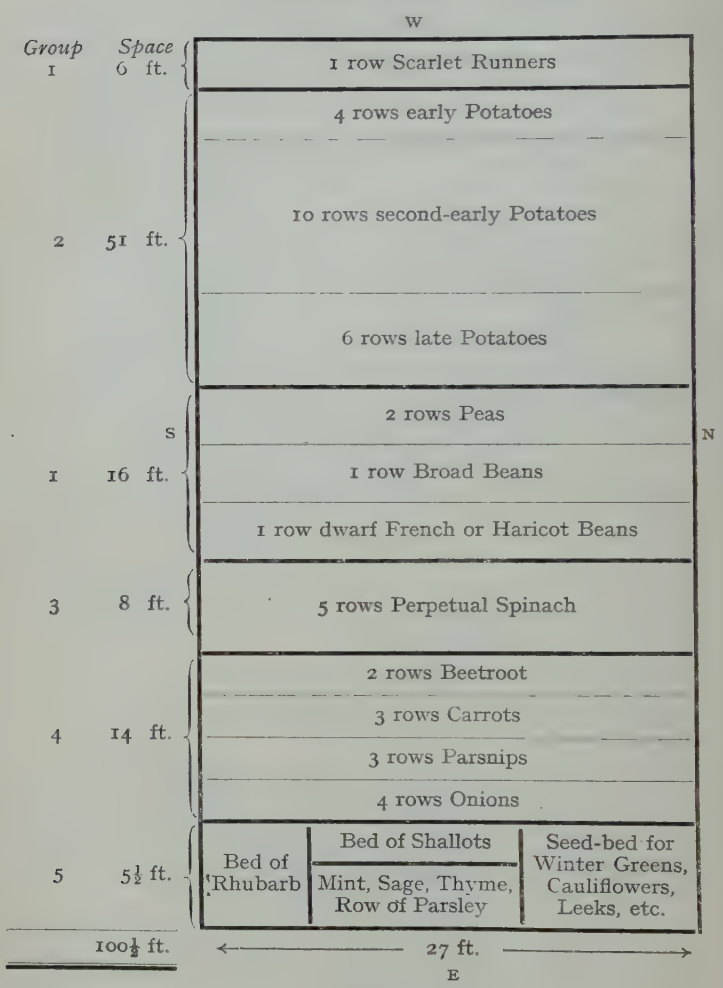
This arrangement allows (1) a period of five months, during which most of the principal crops are sown or planted, some are cleared and some successional crops are planted; (2) a period of three months, which completes the maturing of the principal crops and sees winter crops established; (3) a period of four months, during which the winter crops are in use and preparations are made for the second year's cropping.

The references to the Plans and the accompanying notes on the principal crops will make the system clear to the veriest tyro, who, by studying them in the light of the Tables and the individual notes, will be able to secure abundant crops of valuable and delicious food.

PLAN I. A 10-ROD PLOT WITH ITS CROPS FROM MARCH TO JULY INCLUSIVE—FIRST SEASON

Length of plot, 100½ ft. Width, 27 ft. = $\frac{1}{16}$ acre (10 rods)

For full references see opposite page



REFERENCES TO PLAN I

Five groups are arranged, bringing in every important crop

GROUP 1. *Peas and Beans.* The Scarlet Runners—allowed 6 ft.—are separated from the other Peas and Beans in order to give them an end position, which may be kept for them every year. Lettuces may be planted in front, and Radishes sown broadcast in March to get crops before the Runners need the ground at mid-May. Turnips may be sown and Lettuces planted between the Peas. After Broad Beans and early Peas have been cleared off in July, Celery (and Leeks also if desired) may be planted in their places. Coleworts may be planted after French Beans. The Pea rows are allowed 4 ft. each, and the Broad Beans and French Beans 2 ft. each. See also Plans II and III.

GROUP 2. *Potatoes.* 4 rows of early Potatoes are planted 2 ft. apart, 10 rows of second-early Potatoes 2½ ft. apart, and 6 rows of late Potatoes 3 ft. apart. Cauliflowers and Winter Greens may be planted 2½ ft. apart between the earlies and second earlies in June or July. Winter Turnips may be sown broadcast after late Potatoes are cleared in August or September. See also Plans II and III.

GROUP 3. *Perpetual Spinach.* 5 rows may be sown 18 ins. apart; the bed will stand for a full year.

GROUP 4. *Roots and Bulbs.* A portion of the ground cleared of Beetroot, Carrots, and Parsnips (the rows of which are 15 ins. apart) in October may be prepared and sown with Peas and Broad Beans for the second year. The rest may be left fallow. The ground cleared of Onions (rows 1 ft. apart) may be planted with Cabbages 2 ft. apart in October for the second year. See also Plans II and III.

GROUP 5. *Rhubarb, Shallots, Herbs, and Seeds.* The Rhubarb and Herbs will become permanent crops. After the Shallots (rows 1 ft. apart) are cleared in July, autumn Turnips may be sown broadcast. Bush Vegetable Marrows 2 ft. apart may follow the seedling Greens. If Tomatoes are wanted, plant a row between groups 4 and 5 in June. See also Plans II and III.

PLAN II. THE 10-ROD PLOT WITH ITS CROPS FROM AUGUST TO OCTOBER INCLUSIVE—FIRST SEASON

For references see opposite page

<table>
<tr><td colspan="3">Scarlet Runners as in Plan I</td></tr>
<tr><td colspan="3">Cauliflowers and Winter Greens succeeding early and second-early Potatoes</td></tr>
<tr><td colspan="3">Late Potatoes as in Plan I until August or September, when they are cleared and winter Turnips are sown</td></tr>
<tr><td colspan="3">Celery (and perhaps Leeks) following Peas and Broad Beans</td></tr>
<tr><td colspan="3">French Beans cleared in August and Coleworts planted</td></tr>
<tr><td colspan="3">Perpetual Spinach as in Plan I</td></tr>
<tr><td colspan="3">Beetroot as in Plan I</td></tr>
<tr><td colspan="3">Carrots as in Plan I</td></tr>
<tr><td colspan="3">Parsnips as in Plan I</td></tr>
<tr><td colspan="3">Onions till August, Cabbages for spring planted in October</td></tr>
<tr><td>Rhubarb as in Plan I</td><td>Autumn Turnips following Shallots
Herbs and Parsley as in Plan I</td><td>Bush Vegetable Marrows following seedlings</td></tr>
</table>

REFERENCES TO PLAN II

GROUP 1. The Scarlet Runners and dwarf French Beans still stand, but the latter will make way for COLEWORTS in August, unless Haricots are standing to ripen their seeds. The Peas and Broad Beans have given place to CELERY.

GROUP 2. The early and second-early Potatoes have given place to AUTUMN CAULIFLOWERS and WINTER GREENS. The late Potatoes stand till August or September, when they give place to WINTER TURNIPS.

GROUP 3. *Perpetual Spinach.* No change.

GROUP 4. No change, except that Onions are pulled in August and Cabbages for spring are planted in their place in October.

GROUP 5. Autumn Turnips and Vegetable Marrows have taken the places of SHALLOTS and SEEDLINGS respectively. (N.B.—A Bush form of Marrow is suggested because it comes into bearing earlier than the running form, but the latter may be chosen if preferred.)

PLAN III. THE 10-ROD PLOT WITH ITS CROPS FROM NOVEMBER TO FEBRUARY INCLUSIVE—FIRST SEASON

For references see opposite page

<table>
<tr><td colspan="3">Scarlet Runners dying; prepare ground for second year</td></tr>
<tr><td colspan="3">Autumn Cauliflowers and Brussels Sprouts in use; other Winter Greens coming on for winter and spring</td></tr>
<tr><td colspan="3">Winter Turnips following late Potatoes</td></tr>
<tr><td colspan="3">Celery as in Plan II</td></tr>
<tr><td colspan="3">Coleworts as in Plan II</td></tr>
<tr><td colspan="3">Perpetual Spinach as in Plans I and II</td></tr>
<tr><td colspan="3">Part of ground cleared of Roots sown with Peas and Broad Beans for second year</td></tr>
<tr><td colspan="3">Spring Cabbages as in Plan II</td></tr>
<tr><td rowspan="2">Rhubarb as in Plans I and II</td><td>Autumn Turnips as in Plan II</td><td rowspan="2">Spring Lettuces after Vegetable Marrows</td></tr>
<tr><td>Herbs and Parsley as in Plans I and II</td></tr>
</table>

REFERENCES TO PLAN III

GROUP 1. Scarlet Runners thrive on the same ground in successive years if the soil is deeply dug or trenched and well manured. If desired, the old roots can be left in the ground till March with leaves over them, then lifted and put in deep boxes with soil among the roots and set in a frame to start growth. Meanwhile, the soil is prepared for them and planted with Lettuces and sown with Radishes till mid-May. When thus treated, Runners do well from old roots. Celery occupies the old site of the Peas and Broad Beans, of which fresh sowings are made on the site cleared of Roots in October and November.

GROUP 2. Potatoes have all been cleared and their places are occupied by Autumn and Winter Greens and Winter Turnips, most of which will occupy the ground till spring. In spring the tops of the Turnips will be very useful.

GROUP 3. *Perpetual Spinach.* No change. This admirable vegetable will give pickings throughout the winter unless the weather is very severe.

GROUP 4. *Roots.* All are in store and part of the ground sown with Peas and Broad Beans for the second year. Peas should only be sown in autumn if the district is mild and the soil friable and well drained. Broad Beans should always be sown in autumn.

GROUP 5. No change, except that Spring Lettuces have taken the places of Vegetable Marrows. Autumn Turnips are in use part of the time.

PLAN IV. THE 10-ROD PLOT WITH ITS CROPS FROM MARCH TO JULY INCLUSIVE—SECOND YEAR

For references see opposite page

<table>
<tr><td colspan="3">Scarlet Runners after early Salads as in first year</td></tr>
<tr><td colspan="3">2 rows of Beetroot</td></tr>
<tr><td colspan="3">3 rows of Carrots</td></tr>
<tr><td colspan="3">3 rows of Parsnips</td></tr>
<tr><td colspan="3">4 rows of Onions</td></tr>
<tr><td colspan="3">New bed of Perpetual Spinach</td></tr>
<tr><td colspan="3">4 rows of early Potatoes</td></tr>
<tr><td colspan="3">8 rows of second-early Potatoes</td></tr>
<tr><td colspan="3">6 rows of late Potatoes</td></tr>
<tr><td colspan="3">Old bed of Perpetual Spinach, to be cleared when the new one comes into bearing and followed by Leeks</td></tr>
<tr><td colspan="3">1 row of Peas</td></tr>
<tr><td colspan="3">1 row of Broad Beans</td></tr>
<tr><td colspan="3">Bed of Spring Cabbages</td></tr>
<tr><td rowspan="2">Rhubarb as first year</td><td>Shallots following Autumn Turnips</td><td rowspan="2">Seed-bed for Greens, Leeks, etc., after Spring Lettuces</td></tr>
<tr><td>Herbs and Parsley as first year</td></tr>
</table>

REFERENCES TO PLAN IV

Slightly smaller quantities of Potatoes, Peas, and Beans are grown the second year than the first, because allowance has to be made for the bed of Spring Cabbages and for a fresh bed of Perpetual Spinach.

Peas, Beans, Beetroot, Carrots, Parsnips, and Onions. These crops get a change of ground. Otherwise the rules for the first year apply. The same crops may be grown between and after them as before.

Potatoes. A part of this crop gets a change of ground, but a portion of the crop comes on to the Potato ground of the previous year. This will not matter if the soil is well prepared and the seed good.

Perpetual Spinach. A new bed is made and as soon as it comes into bearing the old bed is cleared off, the ground well dug and manured, and a crop of LEEKS planted.

Spring Cabbages. This bed will be in bearing till June or perhaps July, when it may be cleared and the ground sown with a crop of AUTUMN TURNIPS.

Rhubarb, Shallots, Herbs, and Seed-bed. Same as in first year, with similar crops succeeding the SHALLOTS and SEEDLINGS.

PLAN V. THE 10-ROD PLOT WITH ITS CROPS FROM AUGUST TO OCTOBER INCLUSIVE—SECOND YEAR

References as for Plan II

<table>
<tr><td colspan="3">Scarlet Runners</td></tr>
<tr><td colspan="3">2 rows of Beetroot</td></tr>
<tr><td colspan="3">3 rows of Carrots</td></tr>
<tr><td colspan="3">3 rows of Parsnips</td></tr>
<tr><td colspan="3">Spring Cabbages succeeding Onions</td></tr>
<tr><td colspan="3">5 rows of Perpetual Spinach</td></tr>
<tr><td colspan="3">Autumn Cauliflowers and Winter Greens following early and second-early Potatoes</td></tr>
<tr><td colspan="3">6 rows late Potatoes till August or September, then Winter Turnips</td></tr>
<tr><td colspan="3">Leeks following original bed of Perpetual Spinach</td></tr>
<tr><td colspan="3">Celery following Peas and Broad Beans</td></tr>
<tr><td colspan="3">Autumn Turnips following Spring Cabbages</td></tr>
<tr><td rowspan="2">Rhubarb</td><td>Winter Turnips following Shallots</td><td rowspan="2">Vegetable Marrows following seedlings</td></tr>
<tr><td>Herbs</td></tr>
</table>

PLAN VI. THE 10-ROD PLOT WITH ITS CROPS FROM NOVEMBER TO FEBRUARY INCLUSIVE—SECOND YEAR

References as for Plan III

<table>
<tr><td colspan="3">Scarlet Runners cleared or covered with leaves as in Plan III</td></tr>
<tr><td colspan="3">Roots cleared and part of ground sown with Peas and Broad Beans for third year</td></tr>
<tr><td colspan="3">Spring Cabbages in place of Onions</td></tr>
<tr><td colspan="3">5 rows of Perpetual Spinach</td></tr>
<tr><td colspan="3">Autumn Cauliflowers and Winter Greens</td></tr>
<tr><td colspan="3">Winter Turnips in place of late Potatoes</td></tr>
<tr><td colspan="3">Leeks</td></tr>
<tr><td colspan="3">Celery succeeding Peas and Broad Beans</td></tr>
<tr><td colspan="3">Autumn Turnips after Spring Cabbages</td></tr>
<tr><td rowspan="2">Rhubarb</td><td>Autumn Turnips or Prickly Spinach after Shallots</td><td rowspan="2">Spring Lettuces or Prickly Spinach after Marrows</td></tr>
<tr><td>Herbs</td></tr>
</table>

BRIEF NOTES ON THE PRINCIPAL CROPS INCLUDED IN THE PLANS

Potatoes. The calculation of the Potato crop in the first year is as follows:

Section	*No. of rows*	*Inches apart in rows*	*Total number of plants*	*Crop per plant lb.*	*Total lb.*
First early . .	4	12	108	1½	162
Second early . .	10	12	270	2	540
Late	6	15	126	3	378
					1080

The yield is good, but can be secured with care and attention, and the selection of varieties that crop heavily.

Procure fresh, sound seed averaging 2 to 3 oz. in weight—respectively of the sizes of small and large hens' eggs. Cut sets of late varieties in halves, but leave earlier uncut. In the case of the earlies, set the seed in a shallow box in February and March to start a strong sprout on each tuber. Keep it in a cool but frost-proof place. Take care not to break off the sprout; the first sprout which pushes is generally the best.

Prepare a deep, friable root-run. Manure as advised under Manures.

Have the rows of first earlies 2 ft. apart, the second earlies 2½ ft. apart, and the lates 3 ft. apart. Set the seed tubers 12, 12, and 15 ins. apart in the rows respectively; 18 ins. is not too much for strong varieties. Plant in wide drills 3 ins. deep and draw another 3 ins. of soil over the tubers in a ridge. Plant the lates at the same time as the earlies in March or early April.

Choose heavy-cropping varieties, such as Sharpe's Express, Eclipse, Arran Banner, and Great Scot. Quantity of seed required per square rod: early, 14 lb.; second-early, 12½ lb.; lates, 7–8 lb. cut.

Autumn, Winter, and Spring Greens. Autumn and Winter Greens consist of Borecole, Broccoli, Brussels Sprouts, Cauliflowers, Coleworts, and Savoys. All of these may be sown in lines 1 ft. apart in April and May and planted 2½ ft. apart between early and second-early Potatoes in June or July. They will give Greens from October to April inclusive. With the Cabbages planted to follow Onions (these Cabbages being sown early in August and planted in October) and the Perpetual Spinach, which is sown in April and stands for a full year, they will maintain a supply of green vegetables every day throughout the year. Late-sown Coleworts may follow French Beans. A change "Green" of enjoyable flavour is provided by Turnip tops. Cabbages could be had in summer and autumn by sowing in April and May, but they can be dispensed with and are best left out of consideration in a small plot because they do not fit in with the cropping schemes. Half an ounce of seed will produce several hundreds of plants.

Peas and Beans. These crops should always have deeply-dug or trenched and well-manured ground. Pilot (4 ft.) generally does well if sown in October. Mazagan Broad Beans are good for November

sowing. The rows should run north and south, so that sunlight may get between the rows to every plant. Peas should be sown in wide drills 2 to 3 ins. deep, not more than a pint to 24 yards. Allow the same distance between the rows as the stated height of the plant. Autumn Beans should be set 6 ins. and spring Beans 8 ins. apart, the rows 2 ft. apart. Scarlet Runners should be grown on poles, preferably at one end of the plot, and with good tillage they may be grown successfully on the same ground year after year. The seeds should be set 1 ft. apart 3 ins. deep in May and a separate pole, at least 7 ft. above the surface, provided for each plant. The plants twine in spirals in a direction opposite to the course of the sun, and at first need tying. Dwarf Beans may be sown 8 ins. apart in rows 2 ft. apart in May.

Quantities of seed to allow: Peas and Broad Beans, 1 pint to 70 ft.; Dwarf Beans, 1 pint to 120 ft.; Runners, 1 pint to 270 ft.

Celery and Leeks. These useful crops conveniently follow early Peas and Broad Beans in July. The seed should be sown in boxes of fine soil in February, and put, if possible, in a greenhouse or frame. But Leeks may be sown with the Greens on the seed plot and transplanted thence when required. Both crops are grown in trenches, but Leeks do well dropped into holes made with the dibber. Both are benefited by earthing, Celery needing more than Leeks. Leeks may also follow Turnips. Ground that is to carry good crops of Peas, Beans, Celery, and Leeks in the same season needs thorough preparation. A fresh site should be chosen every year and bastard-trenched if possible, but at the least should be deeply dug and liberally manured. ½ oz. of seed will produce several hundreds of plants in each case.

Onions and Shallots. In cropping a small plot, what are called " autumn " Onions, that is Tripoli and Rocca Onions sown in August and transplanted in autumn or spring, are best ignored, as they are not good keepers and do not fit well into the schemes of cropping. Shallots may be grown instead. The bulbs give an excellent crop of early summer Onions if planted shallow (not buried) 12 ins. apart all ways in rich soil in winter or early spring. Underground (Potato) Onions may be treated in the same way. Both crops are ready in July and will keep several weeks. Seedling Onions are best sown in rich but firm ground in March, the rows 1 ft. apart, the plants very slightly thinned. But a large variety like Ailsa Craig may be sown in boxes in a greenhouse or frame in winter and the plants put out in rows 15 ins. by 9 ins. at the end of April. 1 oz. of Onion seed will sow 150 ft. of drill.

Root Vegetables. Beetroot, Carrots, and Parsnips keep, like Potatoes, for several months, but it is wise to leave Parsnips in the ground all the winter. They are best sown 1 in. deep in rows 18 ins. apart in March or early April, and thinned to 1 ft. apart. Carrots may be sown 1 in. deep in April and May, rows 1 ft. apart, plants thinned only sufficiently to develop to their full size, i.e. 4 to 6 ins. apart. Beetroot is best sown 2 ins. deep in rows 1 ft. apart in May and thinned to 1 ft. apart. On larger plots Salsify and Scorzonera may also be grown with advantage, but hardly justify space on small plots. Turnips are useful, because they can be matured in a few weeks, consequently, several crops can be grown in a year. And the

tops as well as the roots are good. Early Turnips can be taken from ground to be cropped with Scarlet Runners. 1 oz. of Beetroot sows 70 ft.; 1 oz. Carrot, 180 ft.; 1 oz. Parsnip, 180 ft.; 1 oz. Turnip, 200 ft.

Spinach, Tomatoes, and Vegetable Marrows. Perpetual Spinach (Spinach Beet) is more reliable and productive than either round or prickly Spinach. Sow 1 in. deep in rows 18 ins. apart at the end of April and thin to 1 ft. apart. Tomatoes and Vegetable Marrows are best sown under glass and planted in June or July. Tomatoes do well on a warm wall or fence, with all side shoots picked out.

Intensive Culture: First and Second Years. In the cultivation of vegetables under the intensive system, the grower does not clear all the ground at the end of the first year. Certain crops sown or planted during the first year occupy the ground for a part of the second. But some portions of the ground may be uncropped during autumn or winter, and these should be thoroughly prepared for the following season. There is no ultimate loss in having a given piece of ground bare for a few weeks if the opportunity is taken to put it into first-class condition, by deep cultivation and manuring.

It is not necessary to change the ground for each crop every season. Potatoes, Scarlet Runners, and most roots, including Onions, thrive on the same ground for many years if it is well prepared for them; nevertheless, certain changes are desirable, hence the second set of plans, IV, V, and VI.

Intensive Culture: Third Year's Cropping. It is not necessary to give sections of the third year's cropping, which may be on the same principles—that is, making changes of ground between (*a*) Peas and Beans (which carry with them Celery and perhaps also Leeks) and (*b*) roots; changing the ground for Greens; and making fresh beds of Perpetual Spinach and Spring Cabbages. The intercropping can be as before.

Intensive Culture: Intercropping. Potatoes defy any grouping which does not allow for access to the soil between the rows, because of the necessity for earthing. Unearthed Potatoes are likely to be green through exposure to the air, and therefore useless either for table or market, although quite suitable for replanting. It is for this reason that we are compelled to associate with Potatoes crops which can be planted after May, such as Tomatoes, Celery, Cauliflowers, Brussels Sprouts, Savoys, Kales, Broccoli, Vegetable Marrows, and Scarlet Runners. And as a rule it is best to restrict the intercropping to early varieties of Potato, which, being ready for removal from the ground by July at latest, can be taken away before the intermediate crops require a great deal of room; and which, having no great spread of leafage, do not overgrow their smaller companions.

The intercropping of Potatoes with Greens as practised by the cottager can hardly be called Intensive culture, because the Greens do little more than follow the Potatoes; but when the gardener imitates the market man and sows Scarlet Runners between every other pair of Potato rows in May or June, following this up by planting Cauliflowers of a late variety on the site of every alternate Potato row after the Potatoes are lifted in June, July, or August, so that Runners and Cauliflowers share, in summer, ground that was

occupied by Potatoes alone in spring, it is a genuine example of Intensive culture. The Scarlet Runners must not, of course, be permitted to run upwards unchecked like their sisters of the pole, but must be kept pinched back, so that they do not grow more than 2 ft. high. And Intensity is intensified when, after the clearing away of Runners and Cauliflowers in autumn, Turnips are sown or Lettuces planted.

There are not wanting cases of Vegetable Marrows being planted between Potatoes in June, set 3 or 4 ft. apart and the extending shoots trained between the Potato rows until such time as the Potatoes are removed.

To plant Tomatoes between Potatoes is to associate cousins, for these crops are relations. We know that relatives often agree least well and while Tomatoes and Potatoes are satisfactory companions in health, they are the worst in disease, because what infects the one infects the other. On a well-drained site they may be put together after the Potatoes have been earthed, and followed by late Broccoli, spring Cabbages, or winter Lettuces. Here again is an example of genuine Intensive culture.

There are cases of intercropping with Potatoes in which one works with a wide outlook; for example, the first year one plants early Potatoes and intercrops with a late variety of Broccoli such as Late Queen, or Chappell's Cream, or Methven's June. The Broccoli crop is not ready until the late spring or early summer of the second year, when the range of suitable successional crops is limited, if one excludes, as one should, the same tribe. But while the crop of Broccoli is approaching maturity in the second year, a batch of Tomatoes is being raised for the purpose of following the Broccoli and in due course takes their place. And even now the succession is not complete, for in early August, when the Tomatoes are beginning to fruit, Cabbages and Lettuces are sown, to be ready to succeed the Tomatoes. Thus we carry our chain of cropping into the third year.

Considered collectively, the Brassicas (Greens) are almost as important as the Potato, indeed, in a small garden it is often wise to restrict the area for Potatoes in order to find room for delicious little Cauliflowers, Broccolis, Cabbages, and allied plants. More especially will one do this if the soil is heavy clay, yielding Potatoes of inferior flavour. The Brassicas revel in such soil.

We cannot treat them as one culturally, however; indeed, their management differs widely. The greater part of the winter greens can go out 2½ ft. apart between early Potatoes in early summer. Sown in a spare bed successionally from the end of March until the end of April, they will be ready for planting soon after the Potatoes have been earthed and the first rain is taken advantage of to get them established. From autumn until the end of spring one or other of these hardy and useful Brassicas will be yielding. And autumn Cauliflowers may have precisely the same treatment, or may be associated with early Potatoes and Scarlet Runners in an interesting example of Intensive culture—an example far superior to the planting of one Potato crop after another, as is sometimes recommended.

But while the bigger Brassicas can be disposed of somewhat summarily, *finesse* is required with certain of the smaller kinds. Perhaps there is nothing more delicious than a young Cauliflower, the size of

a cricket ball, so close in grain that one cannot see the incipient flower-stems and almost as white as the driven snow. One can get these milk-white balls by sowing in autumn and wintering the young plants in frames—even outdoors in mild places—and also by sowing in heat in winter, hardening in cold frames, and planting out in spring. Or one can buy seedlings. They will be in season in June and July, when probably the last of the Broccolis has gone. No large bed is required, for the crop is not one of the great staples of the garden; it is almost in the nature of a vegetable luxury, which one grows on a special bit of soil that perhaps carried winter Turnips, and when they were cleared away was well dug and manured for the delicacy to follow. The plot will carry Celery or Leeks to perfection after the Cauliflowers, and the two successions will be ready for planting by June if they are raised in a frame in spring.

Then there are spring Cabbages. We can get these by sowing out of doors early in August; and we may, if we like, plant them to follow Tomatoes. But they may follow any crop, not being a Brassica, which comes off the ground towards the end of summer or in early autumn—Onions, for example. Summer Cabbages come from outdoor sowings made in spring and successions may be carried through to the autumn or winter if they are wanted. The Coleworts are so often sold as simple " bunch Greens " that home vegetable growers are apt to consider them unworthy of notice, but the hardy green Colewort has value for winter use and may be sown as late as May. The little Rosette Colewort is a charmingly pretty plant as well as a useful one, the leaves having reddish tips. This also can be sown in May.

A Brassica producing large leaf-ribs, which when cooked are white and delicate in flavour, might be sure of popularity, but seedsmen do not find a great sale for the Portugal Cabbage, Couve Tronchuda. Perhaps we have enough good things without it, but there it is if wanted and its culture is simple enough, for it comes without trouble from an outdoor sowing in spring. Where a small reserve section is kept for special things, the Portugal Cabbage should have a place in it.

The so-called Celery Cabbage is the Pé-tsai of the Chinese. It finds its way periodically into the British newspapers, generally by way of America, but is not of great importance.

Brassicas which are to occupy the garden in winter had better be put a good distance from the house, because the most delicious of green vegetables may be disagreeable to delicate nostrils after a spell of damp, foggy weather, when they give off sulphuretted hydrogen.

There is another Brassica to be remembered, although it hardly falls into the schemes of intercropping suited to Greens, and that is the Turnip. It differs from most of the green Brassicas in being quick-growing, at all events during the spring and summer, when it may sometimes be grown to maturity within six weeks. This makes it handy for use as a catch crop—a crop, that is, which fits in between others nominally more important. It may be drilled between Peas in spring, broadcasted after almost any crop cleared off in summer or autumn, such as Peas, Broad Beans, early Potatoes, or Onions; or sown in odd patches anywhere, at almost any time. As bulbs

in summer and as bulbs or tops in winter, the Turnip well proves its worth. And if the flavour is too strong for the palate, either as to bulb or top, there is the Swede to fall back upon. The garden forms of this have delicacy of flavour without delicacy of constitution, indeed, they are hardier than Turnips. Kohl-rabi is another useful substitute.

An example of Intensive culture in which Turnips play a useful part is that in which a piece of ground is well prepared for Onions sown in a frame in winter to be ready for planting in April or May, the rows 1½ ft. apart. Early in March in many seasons, if not in all, Radishes and small early Turnips can be sown between the lines where the Onions are presently to come and they are off before the Onions have grown out so much as to want all the room. But all of it they will need sooner or later, liberal as the allowance of space appears to be, always provided that the plants are strong ones and the soil is rich and substantial. If a small Lettuce is preferred to Radishes and Turnips, it may be planted between the Onion rows in April or May.

Let us turn to Peas and Beans as primary crops. If it has been possible to trench only one portion of the garden, or otherwise to give special treatment to a particular part, allot this section to the Peas and Beans and arrange for Celery and Leeks to succeed them. For all these crops love deep soil and abundant manuring. In spring, Lettuces, Turnips, Spinach, and early Cauliflowers will make good use of the ground between the Pea rows, so abjure the temptation, which many people succumb to, to sow Pea rows nearer together than the height of the plants. With the small intermediate crops coming into maturity before the Peas, it may be feasible to plant Celery and Leeks before the Peas come off, but July is not too late to plant them. Early short Peas sometimes pay for sowing by themselves on a sunny sheltered border in February and they are off in time to plant early Potatoes or some other selected crop.

In connection with the association of Peas and Celery, it may be noted that the order may be reversed if desired; Peas following Celery instead of Celery following Peas. This would be the better order on new ground, which in its crude state would not be likely to give satisfactory crops of Peas and is better filled with Potatoes and Celery the first season. The second season Peas ought to do well on the ground which carried the Celery, because the trenching and feeding for the Celery will have sweetened the land. When the trenches are made for the Celery good use can be made of the ridges of soil, which will give useful crops of Lettuce.

Scarlet Runners may be associated with early Potatoes and late Cauliflowers, the Bean plants being kept short by pinching out the tips. Dwarf kidney or French Beans sown in rows 2 ft. apart may be interplanted with Coleworts in June and be themselves succeeded in autumn by Cabbages or late Broccoli. Thus by an interesting example of Intensive culture we get summer, winter, and spring crops in a continuous succession. And before the Beans were sown a " catch " of Radishes might have been made.

A remarkably successful way of getting heavy crops of Scarlet Runners with small crops between them is to provide for 2 rows 8 ft. apart, the poles 2 ft. apart and 9 ft. out of the ground. At each

end of the row strong horizontal poles are lashed across the top, thus connecting the two lines. A central wire is taken from one horizontal to the other. The framework is completed by setting poles 4 ft. high equi-distant between the 9-ft. poles, and taking stout twine from them to the central wire. We now have accommodation for two sets of Runner plants: one growing up to the top of the tall poles and the other growing up the short poles and along the twine to the wire. The former set follow a vertical line throughout; the latter change from the vertical to the diagonal when they are 4 ft. high and the change of direction, by checking the flow of sap, induces earlier and heavier fruiting on the lower part of the plant. Tremendous yields are secured in this way and the space between the rows of Runners is not wasted, because Lettuces, Turnips, and other short crops are sown between them. This is one of the most modern examples of Intensive culture.

Waxpod Beans are a delicacy appreciated by the few. The " Butter Beans " of the grocer's shop do not mature in Great Britain. Haricots as sold in shops are the ripened seeds of white-seeded varieties of dwarf Beans, some of which, contrary to the general belief, can be ripened in Great Britain.

Broad Beans are not very good subjects for Intensive culture, although useful enough as standard garden crops. If one sowing is made in autumn and another in early spring a crop will be secure and after it is cleared Brussels Sprouts may be planted for succession. Or Celery or Leeks may follow, just as they may follow early Peas.

The tap-root crops as a whole do not lend themselves to inter-cropping, particularly Parsnips and Beetroot. But round Beet comes off early enough for Coleworts to be planted for succession. Carrots can be worked in, because the small " Horn " and other French varieties are very rapid growers when the soil is moist and warm and can be sown as late as July on ground which has been cleared of an early crop, such as Potatoes. The roots do not come very large, but are very sweet and melting. In gardens where there is no difficulty in making the ground friable in spring, a main crop of the larger Carrots may be sown; but on damp, stiff soils which cannot be brought into a fine state, it is wise to be content with smaller roots. If these can be got early, they may be succeeded by Coleworts, which are so useful in winter.

Spinach Beet sown in rows 18 ins. apart in April and thinned to 1 ft. makes a splendid substitute for Spinach proper. Another alternative is the New Zealand Spinach, a plant the flavour of which approximates closely to that of Spinach proper. It has thick, fleshy leaves which radiate from the centre close to the ground and remain prostrate. It is not a hardy plant and the best way of growing it is to sow seed in heat in early spring, transfer the seedlings from the seed pot or box singly to small pots, harden them in an unheated frame, and plant them out a yard apart in May. A small bed will give a long succession of produce and there will be no " bolting " in hot spells.

Silver (Seakale) Beet is esteemed for the leafstalks, which make an excellent substitute for Seakale, but it should not be forgotten that the leaves themselves are more than merely eatable, they have

a palatable Spinach flavour. If sown out of doors about the middle of May, it will be serviceable in the autumn and the following spring.

It is still common to sow Tripoli or Rocca Onions with the spring Cabbages, Lettuces, and Endive early in August. These Onions are ready for use in July of the following year. Late Turnips may be sown on the ground which they vacate. That useful allied crop the Shallot, which gardeners like to get planted in February (they run the risk of being left out in the cold if they apply to the seedsman for bulbs much later), is ready to gather in July and may also be followed by a sowing of late Turnips or by early Carrots.

The Onion crop really only lends itself to Intensive culture with young plants grown for salads. The most that can be done with the main crop is to grow a batch of plants of a large variety from a sowing made in a frame and plant them out in rows 15 ins. apart, so that a crop of Radishes, Lettuces, or Turnips can be grown between them. The main outdoor crop will hardly pay for intercropping and is best sown with the rows about 1 ft. apart and the ground kept firm, so as to get hard bulbs that will keep for several months. After the Onions are cleared off in August or September the space can be filled with Coleworts, or may be planted in October with Cabbages for spring use, or sown in September with winter Spinach.

Market growers of Vegetable Marrows sometimes start them between early Potatoes, but another plan worth mentioning for this useful crop is to plant it 3 or 4 yards apart in a bed of Lettuces, the plants in which, set 1 ft. apart, can have an intercrop of Radishes in their early stages. After the Radishes have gone, the Lettuces will be none the worse for a Vegetable Marrow here and there and will have gone the way of the Radishes long before the Marrows need the whole of the room.

Similarly, a Vegetable Marrow plant can be put in when a Cabbage is cut from a spring bed; and the shelter of the uncut Cabbages will help it until warmer weather comes, with all the Cabbages gone and plenty of room for the Marrows to extend.

Vegetable Oyster. See Salsify.

Veltheimia (vel-tī-mia. Ord. Liliaceæ). Greenhouse bulbs, only one species of which, viridifolia (Aletris capensis), is much grown; it has thick, shining green leaves, and does well in a room window. Sandy loam suits. Propagation is by offsets.

Venidium (vĕn-ĭd-ium. Ord. Compositæ). A small genus, the best-known member of which is calendulaceum (fugax), a hardy annual with yellow and black flowers in summer, height about 18 ins. Sow outside in spring in ordinary garden soil. The newer Cape species fastuosum, orange with purple zone, 2½ ft., does well treated as a half-hardy annual. See Annuals.

Ventilation. See Greenhouses.

Venus's Fly-trap. See Dionaea muscipula.

Venus's Looking-glass. See Specularia Speculum.

Venus's Navelwort. See Omphalodes verna.

Veratrum, False Hellebore (ver-ā-trum. Ord. Liliaceæ). Hardy herbaceous perennials. Album, white flowers in summer, 3 to 5 ft.; nigrum, dark purple; and viride (album viride), green, summer, 3 to 4 ft., are the most grown. The White Hellebore powder used for

killing caterpillars is prepared from album. Good loamy soil or friable clay is liked. Propagation is by seed or division in spring.

Verbascum, Mullein (vĕr-băs-cum. Ord. Scrophularineæ). Hardy biennials and herbaceous perennials or sub-shrubs, mostly with yellow flowers in summer. Chaixii, 3 ft.; cupreum, coppery, 3 ft.; olympicum, 5 ft., a biennial; and phoeniceum, violet, 3 ft., several varieties, are the best species. Densiflorum (thapsiforme), yellow; and Wiedmanniana, violet, are good hardy biennial species. Thapsus is the native Great Mullein. Ordinary soil. Propagation is by seeds, and in the case of the perennials also by division in spring.

Verbena, Vervain (ver-bē-na. Ord. Verbenaceæ). Beautiful and fragrant flowers, once specialised by florists and grown in pots under varietal names, but now generally restricted to the flower garden. Only 3 of the many species are grown to any extent, and they are: (1) Aubletia, mauve, a hardy biennial growing about 1 ft. high, flowering in summer; compacta and rosea are varieties of it; (2) venosa, rosy-lilac, 1 ft., summer, a half-hardy herbaceous perennial, much used in beds and borders on account of its free blooming and distinct colour; (3) chamaedrifolia, prostrate habit, scarlet flowers, which likes a sunny sheltered spot. But hybrids are more popular on the whole.

A comparison is often instituted between hybrid Verbenas and Phlox Drummondii, and a suggestion made that the advance of the latter has been made at the expense of the Verbena. As a matter of fact, there is little room for comparison between the two plants and there has been no decline, but rather an advance, in the hybrid Verbena as a flower-garden plant. As a bedder it never enjoyed so much favour as it does to-day. Extending very rapidly in almost any soil after a slow start, covering the soil with a close mat of deep green foliage, and producing a profusion of beautiful and fragrant flowers for three months, it has strong claims on the attention of amateurs. Mixed beds look so well that it is not necessary to plant out to colour; nevertheless, separate colours are available and seedlings come nearly true. Scarlet (Scarlet King), violet (Princess of Wales), white (Queen of Whites), and pink (Miss Willmott for choice), also blue and rose, are all offered.

Propagation. The hybrid Verbenas are best treated as tender annuals, being raised from seed in heat in winter, pricked off in boxes, hardened, and planted out 18 ins. apart in early summer; they will thrive in any fertile soil.

Venosa, which also comes readily from seed, makes a pretty edging and is hardier than the hybrids. Drummondi, offered by seedsmen, is a variety of Aubletia, with Anemone-like foliage, 1 ft. high; sow in mild heat in March. For Verbena triphylla see Lippia citriodora (Lemon-scented Verbena).

Verbena, Sand. See Abronia.

Verbena, Lemon-scented. See Lippia citriodora.

Veronica, Speedwell (vĕr-ŏn-ica. Ord. Scrophularineæ). A very large genus of herbs and shrubs, mostly hardy, and able to thrive on poor soil.

Hardy Herbaceous Species. Among the best are gentianoides, blue, 2 ft., early summer, there are white and variegated-leaved varieties; incana, violet, forms a silvery carpet in early summer; longifolia

subsessilis, blue, summer, 3 ft.; prostrata, blue, 1 ft., and its white variety alba, also the yellow-leaved variety aurea; repens, creeper, blue; spicata, blue, 1 ft., summer, there are white and rose varieties, and one with variegated leaves; Teucrium, blue, summer, 3 to 4 ft.; dubia and alpina are varieties of it. These may all be propagated by seed or spring division.

Shrubs and Sub-shrubs. Andersoni, purple, late summer, 3 ft., not quite hardy, variegata is a form of it, much used for bedding in the large parks; Bidwillii, blue and white, summer, prostrate; cupressoides, violet, summer, 1 to 3 ft., much grown in the rock garden for its foliage and habit; epacridea, white, summer, half-hardy, the leaves have a buff tint in autumn; Hectori, lilac, summer, 1 to 2 ft., the foliage has a pretty buff tint in autumn; Hulkeana, lavender, 2 ft.; pinguifolia, white, summer, 2 ft., glaucous foliage; saxatilis, the Rock Speedwell, blue, summer, 6 ins., alba and rosea are varieties of it; speciosa, purplish-blue, spring, 2 to 3 ft., half-hardy, evergreen; and Traversii, white, summer, 3 to 6 ft. Chamaedrys is the Germander Speedwell. Syriaca, blue, early summer, 6 ins., is a hardy annual; it has a white variety, alba.

Propagation. Propagation is by cuttings in a sandy mixture of peat and loam under a handlight in spring or summer. The Veronicas like limestone soil.

Vervain. See Verbena.

Vetch. See Vicia.

Vetch, Bitter. See Orobus.

Vetch, Chickling. See Lathyrus sativus.

Vetch, Crown. See Coronilla.

Vetch, Milk. See Astragalus.

Viburnum, Guelder Rose (vī-bŭr-num. Ord. Caprifoliaceæ). A large genus of shrubs and small trees, some hardy and evergreen, others deciduous. Plicatum, strictly tomentosum plicatum, is a splendid deciduous shrub, 4 to 6 ft. high, with sterile flowers in spring. The species Opulus is the common Guelder Rose or Snowball Tree, and sterile a superior garden form in which all the flowers are sterile; there is a variegated-leaved form of Opulus, and also a dwarf, nanum; these are hardy deciduous shrubs. Tinus (Laurustinus) is a hardy evergreen, with white and rose flowers in autumn and winter; it makes a useful shrub from 4 to 8 ft. high, and is compact in habit; there are several forms, including a variegated. The foregoing are the best of the cultivated Viburnums, but Lantana, the Wayfaring Tree of the hedges, is an interesting species, with white flowers in spring and dark berries in autumn. Lantanoides is the American Wayfaring Tree or Hobble Bush. Pyrenaica, purplish-rose flowers in May, 1 ft. high, is a useful hardy herbaceous species. Among modern species may be named the hardy deciduous Carlesii, with white fragrant flowers in May, height 2 to 3 ft.; Davidii, blush, blue berries, evergreen; fragrans, blush, resembles Carlesii, deciduous, candidissima is a pure white form of it; Henryi, a hardy evergreen with coral-red fruits; Sieboldii, cream, blue-black fruit, deciduous; macrocephalum, cream, deciduous; and rhytidophyllum, splendid evergreen foliage. The Viburnums are not particular as to soil. Plicatum enjoys peat and loam. The Laurustinus will thrive almost anywhere; it forces well in winter, as does the Guelder Rose; they

may be potted-up from the open ground in autumn. Propagation is by cuttings under a handlight in autumn in a shady border, or by layers.

Vicia, Vetch, Tare (vĭc-ia. Ord. Leguminosæ). A useful genus, one member of which, Faba, is the Broad Bean (see Bean). Cracca is the Cow Vetch, and lathroides the Spring Vetch. Pyrenaica, purplish rose, 1 ft., is suitable for the rockery. Propagation is by seed.

Victoria Regia (Ord. Nymphaeaceæ). A noble hothouse aquatic, with enormous rimmed leaves, which in some cases are capable of supporting a fairly heavy man, and white or rosy-white flowers 1 ft. across. It came from the river Amazon. It is only suitable for very large places. Propagation is by seed put into a pot of loamy soil and kept in warm water. Trickeri is a newer species, smaller both in leaf and bloom, but otherwise resembling Regia; it will thrive in a cooler house.

Vinca, Periwinkle (vĭn-ca. Ord. Apocynaccæ). Useful evergreens, the hardy members of which, major, purple, summer, 2 ft.; and minor, blue, summer, 1 ft., are good for planting under trees and in other shady places. There is a useful variegated form of major. They are not particular as to soil. Propagation is by division or cuttings in a shady place in spring.

Vine. See Grape Vine and Vitis.

Viola, Violet, Pansy (vī-ola. Ord. Violaceæ). We have few more delightful flowers than the little Viola, for it gives us the Sweet Violet of the hedgerows, the large varieties which we force in frames for winter bloom, the " tufted Pansies " which we use for beds and borders, and many charming species for our rock gardens. All classes should be grown in gardens.

Sweet Violets (Viola odorata). These may be planted 1 ft. apart in good loamy soil spread on a mild hotbed of manure and leaves in September. They will begin to bloom in autumn, and if kept healthy will flower on and off until spring. If neglected they are liable to go wrong through an attack of red spider, but that rarely happens if they are kept supplied with water as required, and air when the weather is fine. If they show signs of weakness they may be stimulated with weekly doses of liquid manure. In spring they may be lifted and divided, if they are varieties of tufted habit, the portions being planted in rich soil in a cool place, where they will soon establish themselves and grow into forcing plants by September. They will not thrive in hot, dry, poor soil in a sun-scorched spot. Some sorts throw out runners, and these may be pegged to the soil and transplanted when rooted. Colonies of Violets should be established in shady, cool parts of the garden and left to flower naturally. The following are splendid varieties of the Sweet Violet:

Comte de Brazza, double white
Czar, large single blue
La France, single violet
Marie Louise, double lavender
Neapolitan or Parma, old, but sweet double lavender
Princess of Wales, large single blue

See also florists' specialities as they appear from time to time.

Bedding Violas or Tufted Pansies. Good for carpeting beds of

standard Roses, for mixing with bedding plants and for forming margins. If put out in April, and picked over weekly, they will bloom all the summer. They may be propagated in autumn by cuttings, like the larger Pansies. For other notes and select varieties, see Pansy, and also Beds and Bedding-out. Viola tricolor is the Pansy or Heart's-ease (see Pansy).

For the Rockery. A few species of Viola are charming for the rockery, notably biflora, yellow, early summer, 3 ins.; calcarata, blue, 6 ins.; cornuta, blue, late spring, 6 ins.; cucullata, violet, spring, 6 ins.; gracilis, purple, 6 ins., spring, major is a good form; lutea, yellow, 3 ins., a native; pedata, blue, spring, 6 ins.; and rothomagensis (Rouen Violet), lavender, 6 ins. There are white varieties of several. They will thrive in most soils, if not hot and dry, but a fertile, friable loam is best. Propagation is by seed under glass in winter in a warm house, pricking off and hardening preparatory to planting out; by division in spring, and by cuttings in a frame in early autumn. Seedsmen offer selections of bedding Violas in separate colours, also gracilis and forms of cornuta, all of which can be raised from seed in the way suggested.

Enemies. In dry places particularly Violas may turn rusty through the attack of red spider. Spray with Volck, a fungicide obtainable from the principal seedsmen and florists, taking care that the fluid reaches the underside of the leaves, and using the strength recommended on the receptacle. Root fungus (Fusarium species or Phytophthora terrestris) is liable to attack Violas, especially when grown for several years under Roses. The plants affected must be destroyed and fresh obtained.

Violet, African. See Saintpaulia ionantha.

Violet, Bog. See Pinguicula.

Violet, Dame's. See Hesperis matronalis.

Violet, Dog's Tooth. See Erythronium Dens-canis.

Violet, Water. See Hottonia palustris.

Viper's Bugloss. See Echium.

Virginian Cowslip. See Mertensia virginica.

Virginian Creeper. The common Virginian Creeper is the Ampelopsis hederacea of botanists. Vitis inconstans of botanists is the modern name of Veitch's Virginian Creeper, which was formerly known as Ampelopsis Veitchii. It is a much better plant than hederacea—less coarse, less rampant; it clings closely by means of small, sucker-like shoots that exude a kind of resin and give it a tight hold on masonry. The foliage is smaller than that of hederacea, and turns bright red in autumn before falling. The Virginian Creepers will thrive in most soils, but in shallow, dry soils they are a good while getting established unless provided with a capacious pocket of loam and manure. They grow and colour best on a south or west aspect. Plant in autumn or spring. Plants from pots may be put in up to May.

Virginian Stock. A well-known dwarf annual, good for margins. Ordinary soil. Sow outside in spring, thin, and pinch off fading flowers to get a long display of bloom.

Virgin's Bower. See Clematis Flammula.

Viscaria, Rock Lychnis (vīs-cā-ria. Ord. Caryophylleæ). The Viscarias are now linked with the Lychnises by botanists, but seedsmen offer cardinalis, caerulea, and oculata, charming annuals with small

leaves, which grow about 1 ft. high. Sow outside in spring in ordinary garden soil and thin to 6 ins. apart.

Viscum, Mistletoe (vĭs-cum. Ord. Loranthaceæ). See Mistletoe.

Vitex (vī-tex. Ord. Verbenaceæ). The species Agnus-Castus is a deciduous shrub with lance-shaped aromatic leaves and lilac flowers in August, height 6 to 10 ft. Although not quite hardy, it is grown outdoors in mild districts. Sandy loam suits. Propagation is by cuttings inserted in sandy soil under a handlight in autumn. Plant in spring.

Vitis, Vine (vī-tis. Ord. Ampelideæ). A genus of climbing shrubs. Vinifera is the Grape Vine (which see). Inconstans (Veitchii, tricuspidata, and japonica of gardens) is the small-leaved Veitch's Virginian Creeper (which see). Coignetiae is a fine species, with large leaves that assume a rich colour in autumn. Pulchra is nearly as good. Labrusca is sweet, and has purplish fruits. Henryana, green leaves with white lines, 5-lobed, red in autumn, will grow on a north wall, is a valuable modern kind. Other good moderns are armata Veitchii, beautiful colour in autumn; flexuosa Wilsonii, bronzy foliage; Himalayana rubrifolia, purple shoots in spring, a true climber; Thomsoni, purple and green, claret below. They are good for trellises and pergolas. They will thrive in any fertile, well-drained loamy soil. Propagation is by cuttings.

Vriesia. See Tillandsia.

W

Wahlenbergia (wāhlen-bēr-gia. Ord. Campanulaceæ). A large but unimportant genus, only a few species being grown. These include Kitaibelii, blue, summer, 6 ins., a hardy herbaceous perennial; saxicola, lilac, early summer, 6 ins., half hardy; and tenuifolia, violet, summer, 6 ins., a hardy perennial. Ordinary soil. Propagation by seeds and division in spring.

Wake Robin. See Arum maculatum.

Waldsteinia (wald-stī-nia. Ord. Rosaceæ). A small genus, only two species being grown much; these are fragarioides (Dalibarda fragarioides), yellow flowers in early summer, height 1 ft.; and trifolia, yellow, spring, 6 ins., a nice rock plant. Ordinary soil. Propagation is by seed or division in spring.

Walks. Good walks are a great advantage in the garden. They are best made by preparing a 9-in. bed, pegs being driven in to get the proper level. Lay in well-rammed stone, chalk, flint, or "hard-core," bound with clinkers, and surface with 2 ins. of gravel. If on sloping ground, it is well to coat the sides with hot tar to take the water down to 3-in. tile drains laid in the bed. The centre may be 3 ins. higher than the edges in a 6-ft. path, and ½ in. may be allowed for every foot wider. The width must, of course, vary with the traffic. If the walk has to carry heavy vehicles, more care should be taken with the foundation. The gravel should be rolled after rain, and should be watered once or twice a year with weed-killer (see Weeds). Leaves should be regularly swept up in autumn. Grass paths should be provided wherever possible, especially among flower beds and along the principal herbaceous borders. See Grass.

Wall Cress. See Arabis.

Wall Fern. See Polypodium vulgare.

Wallflower (Cheiranthus Cheiri. Ord. Cruciferæ). An invaluable hardy plant, best treated as a biennial, flowering profusely in spring from seed sown outdoors the previous June, rich in colour, and deliciously scented. It will thrive in most soils, and never does better than on limestone, which it loves; it will grow on banks and walls. It is not quite happy, however, in town gardens. A patch should be planted near the house, so that the perfume can be fully enjoyed; the soil should be dug, but not manured, unless very poor. Seed should be sown thinly in early summer, the plants thinned, and put out 9 ins. apart in a reserve bed during showery weather in summer; they can then be left without anxiety until the autumn, when places can be found for them in beds and borders.

We see in our consideration of bedding plants (see Beds and Bedding-out) how Wallflowers may be used alone in groups of lawn beds or may be associated with Tulips and other plants. The increased range of colour in modern Wallflowers makes it possible

to devise beautiful combinations which would not have been possible years ago. The great love of the plant for limestone shows itself in unusually swift development on chalky ground, so that the grower who has such soil must avoid early sowing, otherwise the plants will be so huge by autumn that the labour of planting out will be considerable. The early part of July is soon enough. On soils free from lime sowing may be done a month earlier.

Varieties. The popular singles of which a selection is made below are by far the most important for the garden, but the doubles should not be neglected. They are very useful for flowering in pots in cool houses in spring. Separate colours are available. The so-called "annual" Wallflowers are really biennials, but as they flower the same year from spring-sown seed the term is admissible. They are by no means so good as the perennials and serve no such distinct and valuable purpose. While there is no sweeter Wallflower than the Blood Red, it cannot be said that there is much difference in the varieties as far as fragrance is concerned; we may therefore assess merit by habit and colour in making the following selection:

Blood Red. Dwarf and compact; medium-sized flowers; deep red. Plant 1 ft. apart.

Belvoir Castle. Dwarf yellow, good habit; 1 ft.

Cloth of Gold. Tall yellow, very vigorous, yet bushy in habit; flowers large; 1½ ft.

Fire King. Orange salmon, dwarf habit, but rather looser than the preceding; valuable owing to its distinct and beautiful colour; 1 ft.

Eastern Queen. Salmon red, dwarf; 1 ft.

Golden Monarch. Bright yellow, dwarf; 1 ft.

Golden Tom Thumb. Deep yellow, dwarf; 1 ft.

Ivory White. Ivory or dull cream; 1 ft.

Orange King. Orange, similar habit to Fire King; 1 ft.

Primrose Dame. Primrose-coloured, dwarf; 1 ft.

Ruby Gem. Nearly violet; 1 ft.

Vulcan. Velvety red, dwarf; 1 ft.

See also the specialities of seedsmen.

Siberian Wallflower. With the Wallflowers sow the beautiful allied plant Cheiranthus Allionii, often called the Siberian Wallflower, for flowering the following year rather later than the Wallflowers. It is a low plant of neat, dwarf habit, with flowers of brilliant orange, which last a considerable period. This beautiful plant is well adapted for the rock garden. It is a biennial and should be sown afresh every year.

Enemies. Wallflowers suffer from the club-root disease of Brassicas. See remarks under Broccoli.

Wall Pennywort. See Cotyledon Umbilicus.

Wall Pepper. See Sedum acre.

Walls. It is pointed out under Fences that a wall is the best enclosing line for a garden, but likewise the most expensive. The advantages of a wall will go far to outweigh the drawback of extra cost where it is desired to have a support for glasshouses or trained fruit trees, and to form sheltered borders. In large places it is common to find the place protected with an outside fence, and an inner wall built to make an enclosure for glass, fruit, and vegetables. If the

wall has to support large houses it must be at least 10 ft. high, and well buttressed, but it is not necessary to maintain the full height all round. A 6-ft. wall is very useful. Borders from 10 to 20 ft. wide should be made along the wall, and those with south and west aspects will be useful for early crops. A brick wall with a coping looks well. Finials over the gate pillars give a neat appearance. Builders are always ready to supply estimates for erecting walls. Flat-trained trees may be planted to cover the faces.

Wall-gardening. Such plants as Sedums, Dianthuses, Sempervivums, Wallflowers, Corydalises, Arabises, Aubrietias, Alyssum saxatile, Cerastiums, Valerian, and encrusted Saxifrages are established on walls merely by sprinkling a few seeds into chinks. In other cases spikes are driven into the wall to support small flattish stones, on which plants are established. A steep bank may be made beautiful by making a rough wall of unmortared stones against its face, and here all the plants named above, with Campanulas, Hutchinsia alpina, and many other pretty things, will thrive.

Walls are also adorned with fruit and with climbing plants. See Apple, Pear, Peach, etc.; also Climbers.

Walnut (Juglans Regia). The Walnut is hardly a fruit for small gardens, but it is ornamental enough to claim a place in a large garden, and also in parks, while the nuts are highly esteemed. It is a hardy tree, and thrives in most soils unless very poor, dry, and shallow. The nuts are thrashed down in their thick coats in early autumn, and stored for use in winter. See also Juglans.

Wandering Jew. See Saxifraga sarmentosa.

Wand Plant. See Galax aphylla.

Wardian Case. This is useful for sending plants from abroad, for it can be kept close, so that delicate plants are not injured by frequent changes of temperature. We occasionally see one in a room window, but less frequently than of yore. It was a favourite device of our forefathers to block the approach to a window with a large plant case, never open the window, and live in an atmosphere of mustiness. Given abundance of space, a Wardian case planted with ferns has good claims to a place in a shady window. Provision should be made for drawing off surplus water.

Wasps. When present in large numbers, wasps are a great trial to gardeners; they enter fruit-houses and do a good deal of damage. It is a mistake to put bottles of syrup in or near the houses with the object of drawing the wasps away from the fruit, as the sugary preparation attracts wasps to the garden. Queen wasps should be killed when they appear in the spring. Pieces of fine canvas may be put over the ventilators. A handlight trap may be devised. Nests may be sought for, marked, and attacked at night with boiling tar, or a lighted squib of gunpowder and sulphur may be pushed in and the hole stopped with damp earth after the explosion in order to prevent the fumes from escaping.

Water and the Sunk Garden. Water gardens are of several kinds. There is the simple pool made by the adaptation of a depression on the lawn which is difficult to mow in summer and is boggy in winter. Quite a series of charming water beds can be made on falling ground by carrying the rain-water from a portion of the house or garage roofs to an upper pool and letting the overflow from it feed the rest through

trapped-drainpipes. These pipes can be carried down from a second to a third pool, and even from a third to a fourth, until the lowest level of the garden is reached. But one such pool is better than none at all. If the bank which overhangs it is steep one would prefer to terrace it with stones and plant it with alpines than to put it in turf, because the grass would be slippery in wet weather and at all times bothersome to mow. If the pool is to be concreted (the work can be done at slight expense by fixing a framework of battens 2 ins. from the sides, after concreting the bottom 2 ins. thick, filling up the space with concrete and leaving it to set, then removing the battens) everything is under control. The pool can be drained at will, the plants removed, the bottom cleaned, and the plants replaced or fresh ones put in. And with the concrete one is sure that the pool is watertight, always provided that the bottom and sides are quite hard when the casing is applied, so that there can be no shrinking. By carrying the concrete a few inches above the surface of the water and finishing it off on a broad " rim," connection can be made with a tier of stones, unmortared, set round the edge of the pool. Here can be housed the Water Forget-me-not (Myosotis palustris) and other lovely things. 3 ft. as a maximum and 2 ft. as a minimum will suffice for the depth of the water. This type of water garden is a simple adaptation of existing conditions. It is made in a few hours with spade and trowel, first shaping and ramming, then lining with concrete and planting, and it is done at an expenditure of a few shillings. Those beautiful Water Lilies Nymphaeas will be spaced over the bottom, the roots perhaps loosely tied in soil with a casing of moss to keep all together, and the masses kept in place with a few heavy stones. Thus easily and inexpensively is an awkward pit or depression turned into a beautiful and interesting object. The Nymphaeas will be of such beautiful varieties as alba (for cold places), Colossea, Marliacea albida, Marliacea Chromatella, James Brydon, Laydekeri rosea, and William Doogue—varieties which embrace white, yellow, rose, and crimson and are large-flowered. Nymphaea alba is the hardiest, but the others will be safe in most gardens, and year after year will throw up to the surface in spring their thick succulent shoots and leaves, through which the exquisite flowers peep.

In quite shallow water the aquatic Winter Hawthorn, Aponogeton distachyon, should be grown, for it is both beautiful and sweet; and there are many other charming water plants, for which see Flower Gardens: the Water Garden.

It is advisable to empty cement-lined pools in spring every 2 years and scrub them out, then replacing the plants. If slimy masses with black eyes are seen at any time, they may be caught up in a piece of sacking and spread out in the sun to dry up, for they are the eggs of frogs and numerous tadpoles are not wanted in the pool.

It may be that the approach to the site of the pool, while not so steep as to cause great inconvenience in mowing, yet lends itself better to treatment with stones than with turf, in which case a rough path or causeway of flattish stones, if available at no great cost, may be laid. Groups of moisture-loving plants may be set beside the path and on the outskirts of the water.

The large sunk garden which is entirely artificial and can only be

made at considerable expense is a different proposition. It is such a feature as we sometimes find in the grounds of a large domain. We come upon it when we are crossing the great lawn. Below we see a wide path, a broad margin of grass set with conifers, and then the water—almost of the area of a lake. Broad as the expanse is, it is covered in summer with glorious masses of Water Lilies. Or the sunk garden may be surrounded by clipped hedges and the water bordered with low shrubs. In a selected place may be seen a large stone vase, or there may be tubs of Hydrangeas. The swampy margins of the sluggish stream or backwater may be planted with strong Reeds, ornamental Rhubarb (Rheum), Bulrushes, Japanese Irises, and other bold, moisture-loving things. The rustic bridge crossing such a stream will be a pleasant lingering-place for the contemplative Nature-lover, especially on those burning summer days when a cool smell comes up from the sedgy edges.

Watering. Watering has a great bearing on the health of plants, particularly if they are in pots. It may be assumed that every plant needs water when it is growing, but it must not be assumed that it needs the same amount every day. A plant gets rid of more moisture by leaf-evaporation on a hot, dry day than on a cool, wet one, consequently water is more likely to be needed under the former than under the latter conditions. Watering will be necessary almost every day in summer for one plant or another, but not in winter, except in heated houses where the plants are in active growth. As little watering as possible should be done in winter, especially in cool houses, and no water should be sprayed or spilled about. In summer, on the contrary, syringing is a valuable auxiliary to watering.

Signs of Want of Water. Flaccid growth, soil cracking from the side of the pot, hollow ringing of the pot when rapped with the knuckles, are all signs. The last is a good test, and should be used in order to anticipate the two others, which may lead to disaster. If flagging and soil-cracking accompany each other, it is useless to attempt to put matters right by ordinary watering, as the water will all run through rapidly. The pot should be stood in a pail of water for a few minutes, when the soil will swell again.

Room Plants. The common plan of standing pots in saucers of water is not good, except in very hot weather. It does room plants, foliage plants particularly, good to stand them outside during a warm shower, also to sponge the leaves with soft tepid water once a week. Soft water is always preferable to hard. Tea is of no benefit to plants; but ½ oz. each of nitrate of soda and superphosphate per gallon turns water into a valuable liquid manure.

Watering Seedlings. A good plan is to moisten the soil from below by holding the pot or pan up to the brim in a vessel of water, so that the water can rise gently through to the surface. This is better than pouring water on the surface. Use water of the temperature of the house in watering hothouse plants.

Watering-pots or -cans. A selection is useful. A small can with a long spout is handy for use in greenhouses with wide stages. They should be used carefully, in order to avoid sending a flood of water among young plants that have not a very tight hold of the soil. A larger can is useful where water has to be carried for several plants,

also for feeding water into the small one where there is no cask or tank handy to dip from. The watering-pots should be supplied with roses in case it is desired to spread the water in a shower; and it is advisable to have both a coarse and a fine rose, the latter for use with seedlings. Water-cans should be turned upside down when not in use.

Water Aloe. See Stratiotes aloides.

Water Archer. See Sagittaria sagittifolia.

Water Avens. See Geum rivale.

Water Bean. See Nelumbium.

Water Cress. See Cress and Nasturtium.

Water Elder. See Viburnum Opulus.

Water Flag. See Iris Pseudacorus.

Water Gladiole. See Butomus umbellatus.

Water Hawthorn. See Aponogeton.

Water Lily. See Water and the Sunk Garden; also Nymphaea.

Water Lily, New Zealand. See Ranunculus Lyalli.

Water Lily, Yellow. See Nuphar luteum.

Water Reed. See Arundo.

Water Soldier. See Stratiotes aloides.

Water Violet. See Hottonia palustris.

Watsonia (wăt-sō-nia. Ord. Irideæ). A small genus of beautiful Cape bulbs, of which two sorts, Ardernei and Meriana O'Brieni, have pure-white flowers. They are worth growing in pots, and may be potted singly, like Hyacinths, but the bulbs are not procurable till early winter. Sandy loam, with a quarter of leafmould, suits them. They may be started in pots in spring if desired, and planted out in early summer. The flowers are borne in long, graceful spikes.

Wattle. See Acacia.

Wax Flower. See Hoya.

Wax, Grafting. See Grafting.

Wayfaring Tree. See Viburnum Lantana.

Weeds. The fight with weeds may begin when the ground is dug in winter; perennial weeds such as Couch, Dandelion, Bindweed, Daisy, Plantain, Shepherd's Purse, Thistle, Coltsfoot, and Horsetail may then be picked out, thrown into a heap and burned. As fast as annual weeds show in spring they should be hoed out and left exposed to the sun; this should be continued through the summer. The last crop of annual weeds, which has no time to seed, may be dug in as green manure. For weeds in lawns, see Grass and Lawns. Walks may be kept free from weeds by periodical dressings of an approved weed-killer; 1 lb. white arsenic, 1 lb. caustic soda, and 1 gallon water may be mixed, heated, and used at a strength of 1 pint per gallon of water. It is, of course, poisonous.

Weeping Ash. See Fraxinus excelsior pendula.

Weeping Willow. See Salix babylonica.

Weevils. Many weevils are injurious to plants. The principal kinds are dealt with under the crops which they infest. See Broccoli, Peas, etc.

Weigela (wēi-gē-la Ord. Caprifoliaceæ). As stated under Diervilla the shrubs sold under the name Weigela by nurserymen are now called Diervillas by botanists, but the popular name holds. They are among the most useful of deciduous spring-flowering shrubs, for

they are compact in habit and bloom profusely, while they will thrive in any fertile soil. The height is 4 to 8 ft. The flowering shoots should be cut out when the plants go out of bloom to make room for new ones. Rosea, with rose flowers (Diervilla Florida), is the principal species. There are many varieties: alba is white, Abel Carrière, pink, and Eva Rathké deep red. Argentea variegata has variegated leaves. See also Diervilla. Plant in autumn or spring.

Wellingtonia (welling-tō-nia. Ord. Coniferæ). The species gigantea is the same as Sequoia gigantea, which see for selections, etc.

Welsh Poppy. See Meconopsis cambrica.

Westeria. See Wistaria.

West Wind, Flower of the. See Zephyranthes.

Weymouth Pine. See Pinus Strobus.

Whin. See Ulex.

White Ash. See Fraxinus americana.

White Beam Tree. See Pyrus Aria.

White Cypress. See Taxodium distichum.

White Elm. See Ulmus americana.

White or **Snowy Fly.** See Tomato and Broccoli.

White Hellebore. See Veratrum.

White Lime. See Tilia argentea.

White Thorn. See Crataegus Oxyacantha.

Whitlavia (whit-lā-via. Ord. Solanaceæ). Botanists now class this genus with Phacelia. Seedsmen offer grandiflora, which has violet flowers in summer. Height 1 ft. Sow outside in spring.

Whitlow Grass. See Draba.

Wigandia (wi-găn-dia. Ord. Hydrophyllaceæ). Handsome herbaceous perennials, used in bedding and sub-tropical gardening for their fine foliage. Caracasana (macrophylla) is the best. Vigierii, lilac, 6 ft., is also good. They like well-manured loamy soil. Propagation is by seeds in heat in March.

Willow. See Salix.

Willow Herb. See Epilobium.

Willow, Kilmarnock. See Salix caprea pendula.

Willow Oak. See Quercus Phellos.

Willow, Weeping. See Salix.

Wind Flower. See Anemone.

WINDOW GARDENING

This is the only phase of plant culture possible to many people, either because they suffer from bad health, or because they have no garden. But window gardening is worth practising for its own sake, inasmuch as it not only forms a delightful pastime, but makes the home attractive. It might be dealt with in two sections, indoor and outdoor work. Indoor window gardening is often conducted with very bad judgment, especially where there are prize competitions, for the whole of the window space is packed with a pyramidal erection of plants, which prevents access to the window for the purpose of providing ventilation, and darkens the room, thus rendering it unhealthy. There should never be a mass of plants packed in a window. Nor should the window area be blocked with large wire frames. A few well-grown plants on a ledge suffice. These should

be arranged so that the window can be opened easily, in order that there may be no excuse for neglecting ventilation.

Indoor Plants. Plants suitable for indoor window culture in their season are Hyacinths, Tulips, Daffodils, Freesias, Primula sinensis, Pelargoniums, Zonal and Ivy Geraniums, Francoa ramosa (Bridal Wreath), Solanums, Campanula isophylla, Begonias, Cytisus, Heliotrope, Musk, Myrtles, Epiphyllums, and Phyllocactus. The most hardy and accommodating foliage plant is the Aspidistra, but ferns and palms may be grown (see those subjects). Watering presents a difficulty, owing to the necessity for preventing surplus water from splashing about. Perhaps the best plan is to grow the plants in ordinary pots stood within ornamental bowls, which will catch the water that passes through the pots. They should be emptied frequently, especially in winter. An alternative but not good plan is to use earthenware saucers.

Shady Windows. A Wardian case (which see) with ferns is good; or foliage plants may be chosen, such as palms (see Palms), Aralia Sieboldii, India-rubber plants, Aspidistra, and Araucaria excelsa. The best plant for a hanging basket is perhaps Campanula isophylla, blue or white.

Outside Plants. Outside window gardening generally finds expression in window-boxes, which may be made to fit the sill, and should be provided with drainage holes to permit superfluous moisture to escape. These boxes look very well painted dark green, but there is scope for the exercise of handiwork in the form of ornamental tiles, virgin cork, or other embellishments. Those who like to have their boxes furnished the whole year may procure a few small Conifers or Euonymuses for the winter, and put bulbs among them for spring bloom. The Conifers should be grown in tubs through the summer. Failing them, Wallflowers and Primroses, which are green in winter, could be used. For the summer, Zonal and Ivy-leaved Geraniums, Marguerites, Fuchsias, Begonias, Heliotrope, Petunias, Mimuluses, Pansies, and Tropaeolums are available. All of these could be planted in June.

Wineberry, Japanese. See Rubus phoenicolasius.

Winter Aconite (Eranthis hyemalis). See Aconite, Winter.

Winter Cherry. See Physalis Alkekengi and Franchettii, in which the calyx forms a large and ornamental orange bladder; also Solanum Capsicastrum.

Winter Daffodil. See Amaryllis (Sternbergia) lutea.

Winter Green. See Pyrola.

Winter Hawthorn. See Aponogeton distachyon.

Winter Heliotrope. See Petasites fragrans.

Winter Moth. See Apples: Enemies.

Wireworm. The grub of a click beetle, Agriotes or Elater. It is about 1 in. long, thin, yellowish, and very hard. It attacks many plants, and is very destructive in the garden. In mild attacks choice plants can be guarded with baits of Potato, Carrot, or Mangold impaled on sticks, but if the pest is abundant it is well to fallow the ground for at least 3 months, spread on a coat of gas lime at the rate of ½ lb. per square yard, let it lie 6 weeks, and then dig it in. The best crop to follow would be a green vegetable. Another plan is to sow

Mustard and a little rape, say 2 oz. of the former and 1 oz. of the latter, mixed, per rod, after early crops of Potatoes, Peas, and Broad Beans have been cleared off in summer. Dig the Mustard in during autumn or early winter, and leave the ground until spring, then crop as usual. Vaporite or Apterite, 2 lb. per rod, may be dug in during spring. Thorough cultivation does good, both by strengthening the plants and worrying the grubs.

Wistaria (wis-tā-ria. Ord. Leguminosæ). A hardy deciduous climber which produces large pendulous racemes of mauve flowers in early summer. Chinensis (sinensis, Glycine sinensis) is the most popular species; alba, white; flore pleno, double, and variegata, variegated-leaved, are forms of it. Multijuga (grandiflora) is a handsome species, with long lilac racemes, much superior to chinensis. Wistarias ought to have a well-drained loamy soil, deeply worked and well manured, otherwise they will be a long time covering much space, as they are naturally slow growers. Propagation is by layering the young shoots. The branches of old plants should have the side shoots spurred every year to the ripe wood like Grape Vines.

Witches' Brooms (Witch Knots). These are bundles of twig-like growths, seen on Birches, Beeches, Silver Firs, and other trees, and due to fungi. They may be cut out and burned if considered unsightly.

Witch Hazel. See Hamamelis.

Witloef or Witloof. See Chicory.

Woad, Dyer's. See Isatis tinctoria.

Wolf Berry. See Symphoricarpus occidentalis.

Wolf's-bane. See Aconitum.

Wood Anemone. See Anemone nemorosa.

Wood Ashes. Containing potash and phosphoric acid, the ash from garden fires is excellent in the garden. It is good for spreading in the drills when sowing Carrots and other crops, and for dusting over young Turnips to keep down the fly. If spread over heaps of manure or mixed with urine it fixes ammonia. If garden rubbish is burnt carefully in autumn and a coating of soil is put on when the heap becomes a mass of glowing embers, the ash when cool will be valuable.

Woodbine. See Honeysuckle and Lonicera.

Wood Laurel. See Daphne Laureola.

Woodlice, Slaters, Monkey Peas. These small crustaceans often infest plant houses. When disturbed, several of the species curl up into a slaty ball. They are particularly objectionable in Cucumber, Melon, Mushroom, and Tomato houses. As the application of poisonous substances is inconvenient, trapping should be resorted to. Dirty pots partly filled with damp, dirty moss attract them as resting-places. Boiling water does the rest.

Wood Lily. See Trillium grandiflorum.

Woodruff. See Asperula.

Wood Sorrel. See Oxalis Acetosella.

Woodwardia (wood-wārd-ia. Ord. Filices). Vigorous ferns, best grown in a cool house, but safe out of doors in mild districts. The most popular species is radicans, which does well in baskets, where its long, arching fronds show to advantage. Brownii (cristata) is a crested variety of it. Japonica is a good species, with broad fronds.

Areolata (angustifolia) is also fine. Equal parts of peat and loam, with sand, suit. Propagation is by spores (see Ferns) and division.

Woolly Aphis (American Blight). See remarks under American Blight and Apples.

Worcesterberry. A Gooseberry-Black Currant hybrid, with the shape of a Gooseberry and of a dull black colour. It is interesting but not important.

Worms. Darwin has taught us that worms are beneficial to gardeners through the vast system of soil-aeration which they conduct. But they are out of place in flower-pots, and do harm by clogging the drainage. Compost should be passed through the fingers in potting so that small worms may be picked out. When pot plants are stood in frames or in a garden, a thick layer of cinders should intervene between the bottom of the pots and the ground. If worms get into pots, stir a little mustard in some water and pour it in. Worms are a nuisance in lawns when in sufficient quantities to cover the grass with their "casts." Limewater may be used to bring them up; or a special worm-killer may be used; see Grass and Lawns.

Wormwood. See Artemisia.

Wych Elm. See Elm.

X

Xanthoceras (zăn-thŏs-er-ăs. Ord. Sapindaceæ). The species sorbifolia is a deciduous tree with downy branches and feathery saw-edged leaves, and white red-streaked flowers in early summer, height 12 to 15 ft. It is an attractive tree, but not quite hardy, and should therefore have a sheltered place and well-drained loamy soil. Propagation by seeds. Plant in spring.

Xanthorhiza (zăn-thor-ī-za. Ord. Ranunculaceæ). The one species, apiifolia, is a hardy shrub, with lance-shaped toothed leaves and purple flowers, which appear in advance of the leaves in early spring, height 2–3 ft. It does best in loam and peat, with a moist situation. Propagation is by layering in autumn. Plant in autumn.

Xeranthemum (zer-ăn-the-mum. Ord. Compositæ). This genus is now classed with Helichrysum by botanists. Seedsmen offer annuum, purple, summer, 2 ft., and various colours. Sow outdoors in spring, in ordinary soil. Gather the flowers young, and dry in a cool airy place. They are frequently dyed after being dried.

Xiphion and **Xiphium.** English and Spanish Irises. See Iris.

Y

Yarrow. See Achillea.

Yew. Remarks on Yews, with selections of the best kinds, will be found under Taxus, which see.

Yucca, Adam's Needle (yŭc-ca. Ord. Liliaceæ). Handsome foliage plants, several of the best of which, such as angustifolia, filamentosa, and gloriosa, are hardy. Angustifolia has narrow leaves and bears white flowers in July; stricta is a variety of it. Filamentosa, the Silk Grass, has threads on the margins of the leaves and bears white flowers in June; flaccida and variegata are varieties. Gloriosa is longer, with stiff, erect, glaucous leaves, and white or pale red flowers in summer; there are several varieties of it. Recurvifolia, with long recurving leaves and white flowers in summer, is also good. The most popular of the greenhouse species is aloifolia, which has leaves about 18 ins. long, with a reddish spine at the tip; there are many varieties, among which variegata is a favourite. In addition there are many handsome hybrids, such as elegantissima, Guiglielmi, Imperator, magnifica, and praecox. As a rule the

Yuccas do not flower while young, but filamentosa is an exception. They like loamy soil, lightened with mortar rubbish and enriched with decayed manure. Propagation is by suckers or cuttings of the roots inserted in a frame. Whether in pots or outdoors they dislike stiff, wet soil. Little water is needed in winter.

Yulan. See Magnolia conspicua.

Z

Zanthorhiza. See Xanthorhiza.

Zauschneria, Californian Fuchsia (zāusch-nē-ria. Ord. Onagrarieæ). The species californica is a half-hardy Californian shrub, growing about 1 ft. high, with scarlet flowers in summer. It may be grown in light loamy soil on a sunny rockery or in pots in a frame. Propagation is by seeds or cuttings.

Zea, Maize, Indian Corn (zē-a. Ord. Gramineæ). See Maize.

Zebrina. See Tradescantia.

Zelkova (zel-kō-va. Ord. Urticaceæ). A small genus of deciduous Elm-like trees, with toothed leaves and greenish, scented flowers in spring. The species acuminata grows 20 to 40 ft. high. Planera acuminata is another name for it. Davidii is a modern Chinese tree of slender habit. Friable loamy soil suits. Propagation is by layers in autumn. Plant in spring.

Zenobia speciosa (zen-ō-bia. Ord. Ericaceæ). The species speciosa (Andromeda cassinaefolia) is a hardy shrub, with white drooping flowers in summer, height 3 to 4 ft. It likes sandy peat. Propagation is by seed in spring or layers.

Zephyranthes, Zephyr Flower (zephy-răn-thēs. Ord. Amaryllideæ). A small genus of bulbs, the most popular of which are Atamasco (Amaryllis Atamasco), pale pink, spring, 15 ins. high, half hardy; and candida (Amaryllis candida), white, late summer, hardy; the Peruvian Swamp Lily, Andersoni, yellow, spring, 6 to 9 ins., is pretty; it needs greenhouse culture. Loam with sand and a third of leaf soil suit. Propagation is by offsets, or seed if procurable.

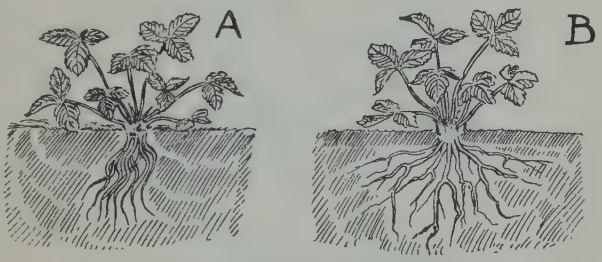
Zinnia (zĭnn-ia. Ord. Compositæ). The annual elegans, single and double, in various colours, is a most brilliant plant, growing from 1 to 2 ft. high. Seedsmen offer separate colours as well as mixtures. Cactus-flowered, Dahlia-flowered, and dwarf types in various colours, are offered in catalogues. The doubles are the most effective, and they are good both for greenhouse and flower garden. They may be raised from seed in a warm house or frame in spring, pricked off, and either potted singly as required, or hardened in a cold frame and planted in June. Zinnias are often classed with half-hardy annuals, but they require more heat for starting than the majority and more care in hardening-off. It is rarely safe to plant them outdoors before mid-June. Nice plants may be flowered in 5-in. pots.

Zygopetalum (zȳ-go-pet-alum. Ord. Orchidaceæ). A large genus of Orchids, flowering in autumn and winter. The beautiful species

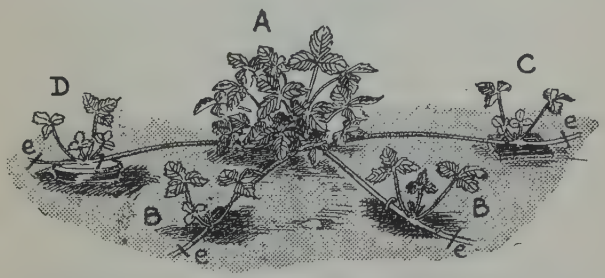
Mackaii or Mackayi has greenish flowers lined with yellow and striped with violet; it has a strong honey scent. It likes fibrous peat and chopped Sphagnum with a little loam. It succeeds in pots in an intermediate house, and enjoys shade. Other good species are Balli, various colours; candidum, white and violet; Dayanum, white, green, and crimson; intermedium, various colours; Lindeniae, pink and white; Wallisii, white and violet; and xanthinum, yellow, red spots. There are also several beautiful hybrids, and likewise bigeneric hybrids between Batemannia and Zygopetalum and Colax and Zygopetalum.

POINTS ABOUT STRAWBERRIES

Bloom on forced plants should be thinned, removing as shown by bars.



PLANTING. A, bad work; B, good work.



PROPAGATING BY RUNNERS. B, pegged to the soil; C, into pieces of turf; D, into pots. Runners stopped at *e*.

(*See page* 399.)

1. Point of previous pruning. 2. Side shoots with young growths (3) to be pruned at the bars (4). 5. Shoot to be removed entirely.

Tree in Following Year. 1 and 2. Main stem. 3. Points of previous year's pruning. 4. Spurs. 5. Young shoots that ought to be pruned at the bars, otherwise they will break weakly at the tips (6). 7. Shoots which have been summer pruned marked for shortening.

(*See pages* 35, 176.)

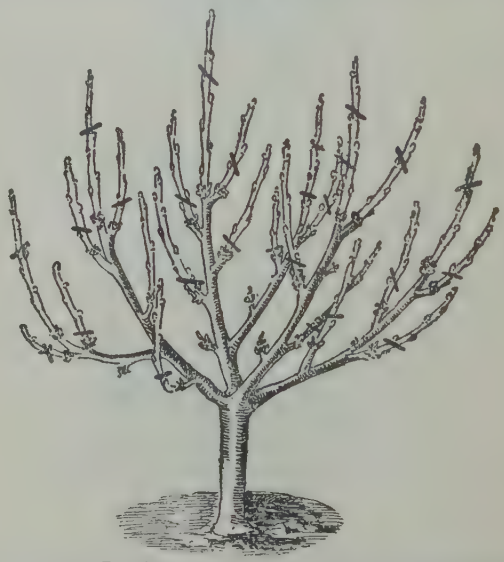
HORIZONTAL CORDONS. The bars show the points of pruning in winter for branches that have been summer pinched.
(*See pages* 35, 173, 177.)

YOUNG FAN TREE. 1. Stock. 2. First pruning. 3. Summer growth. 4. Second pruning.
(*See pages* 177, 314.)

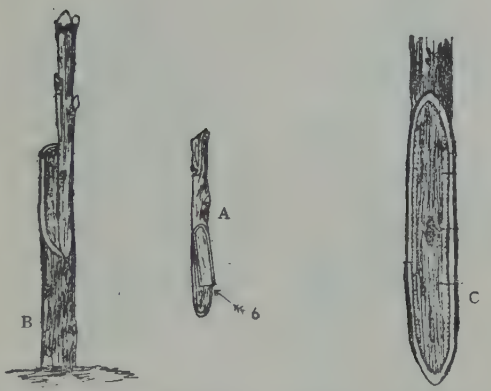
OLDER FAN TREE WITH NEW SHOOTS TIED IN. 1. Fruit spurs.

PRUNING GOOSEBERRIES AND RED CURRANTS

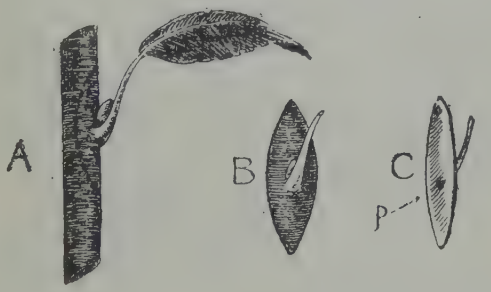
WINTER-PRUNING GOOSEBERRIES. The right-hand side is pruned, the left unpruned. 1. Leader; 2. side shoots; 3, 6, 7, spurs; 4, 5, 8, young shoots. (*See page* 190.)



WINTER-PRUNING RED CURRANTS. Shorten young wood as shown at bars; leave main branches alone. (*See page* 123.)



TONGUE GRAFTING. A, scion prepared, with tongue *b*; B, scion fitted after stock has been tongued; C, first cut shown enlarged before making tongue.
(*See pages* 36, 192.)



BUDDING. A, bud shown in outline; B, bud removed; C, bud after removal of pith *p*.
(*See pages* 34, 74.)

FRUITING OF OUTDOOR FIG. The first (lower) fruits swell and ripen. The second crop (see small fruits above) hang through the winter and fall in spring.
(*See page* 158.)

HOW TO TRAIN RASPBERRIES ON WIRE. Fruiting canes not crowded.
(*See page* 346.)

HOW TO STOP A MELON PLANT AT 1 TO ENCOURAGE LATERAL GROWTH FOR FRAME CULTIVATION
(*See page* 281.)

FRUITING SYSTEM OF MELONS. A, main stem; B, one of the side shoots; C, female bloom; D, male bloom; E, unopened male flowers; F, point of pinching.
(*See page* 281.)

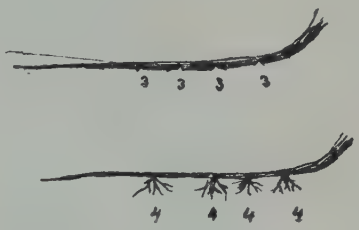
POINTS ABOUT GRAPE VINES

(*See page* 193)

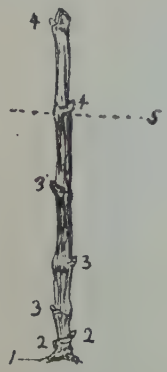
PROPAGATING VINES BY "EYES"

A bud or eye cut from a piece of ripe lateral.

Growth starting.



RENOVATING UNHEALTHY VINES. Coarse, deep-striking roots lifted, notched at 3, 3, 3, 3, and laid in fresh soil, where fibres push 4, 4, 4, 4.

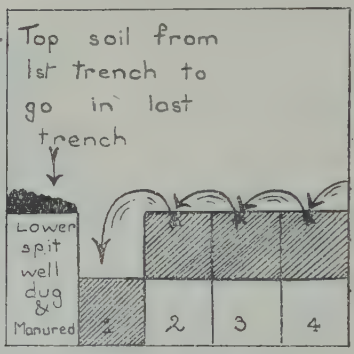


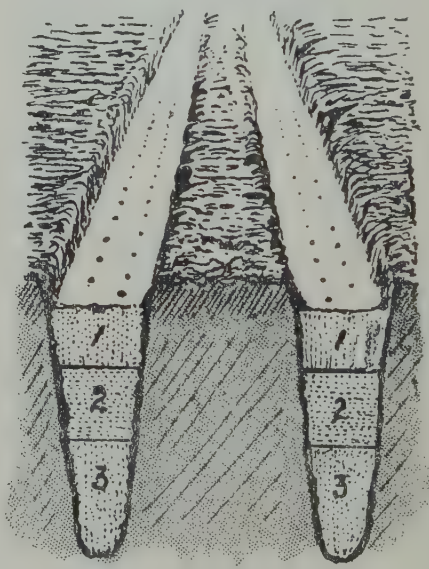
PROPAGATING VINES BY CUTTINGS. 1. Heel of old wood; 2. basal buds (to be removed); 3. stem buds (to be removed); 4. top buds (to be retained); 5. depth to insert.

A BUNCH OF GRAPES THINNED

DEEPENING AND ENRICHING SOIL

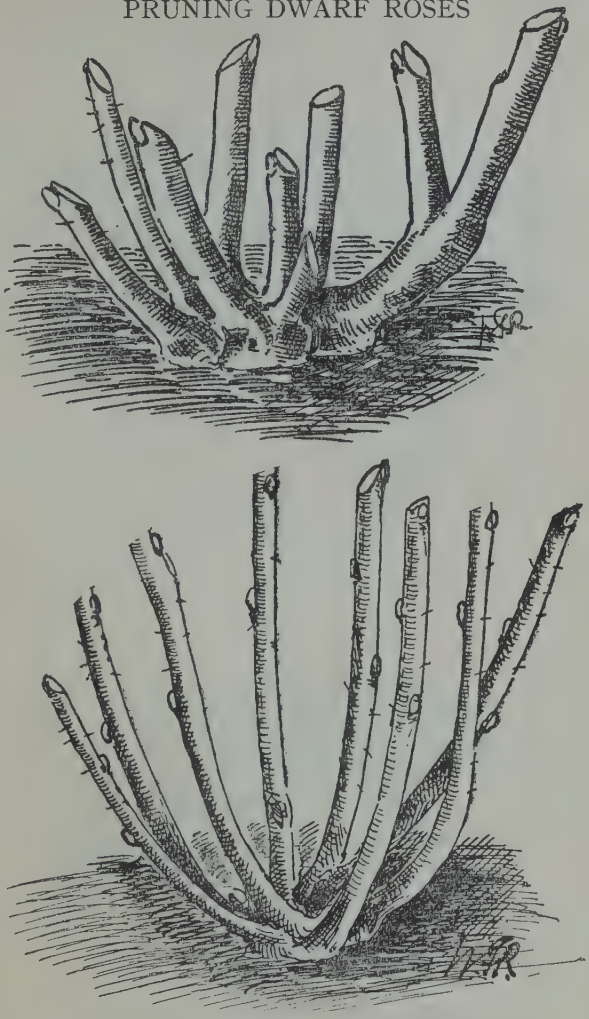
(*See pages* 54, 136, 273)



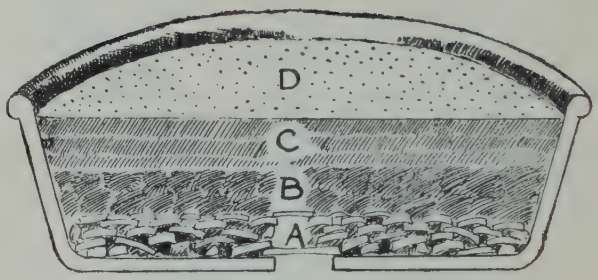


UPPER FIGURE: Bastard-trenching, successive layers 1, 2, 3, 4, being stripped of top soil, dug up, manured, and re-covered.
LOWER FIGURE: Separate trenches made 3 spits deep for prize Sweet Peas, etc.

PRUNING DWARF ROSES

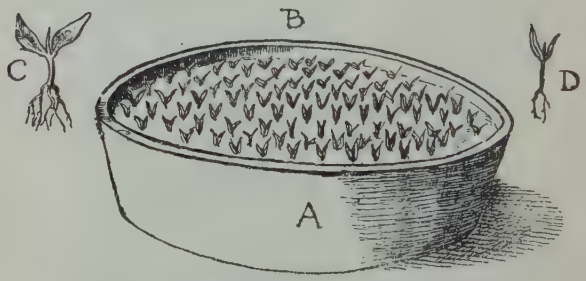


UPPER: Stage of pruning a moderate grower.
LOWER: Stage of pruning a strong grower.
(*See page* 359.)



A Pan Prepared for Seedlings

A, crocks for drainage; B, rough soil; C, fine soil; D, seeds sown thinly, using silver sand for very small seeds.



Pricking-out Seedlings

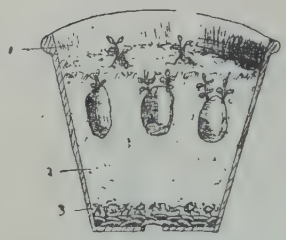
A, pan of light soil; B, seedlings; C, sturdy seedling with good roots; D, weak seedling with poor roots.

(*See page* 376.)

PROPAGATING CHRYSANTHEMUMS AND HYDRANGEAS

A CUT-DOWN CHRYSANTHEMUM showing young sucker shoots, which make good cuttings.
(*See page* 103.)

PROPAGATING HYDRANGEAS BY CUTTINGS. A young shoot inserted in sandy soil in spring.
(*See page* 242.)



GROWING EARLY POTATOES IN LARGE POTS. 1. Space for water; 2. soil; 3. drainage.

(*See page* 336.)

THE POTATO DISEASE (Phytophthora infestans). 1. Spots on the upper surface; 2. diseased patches on under side; 3. healthy leaf.

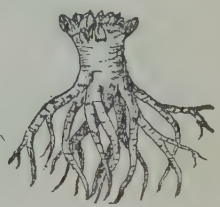
(*See page* 335.)

BLANCHING EARLY CELERY WITH BROWN PAPER. Shows how the paper is drawn round preparatory to tying. Earth should be used for late Celery.

(*See page* 95.)

PLANTING LEEKS. 1. Drill; 2. plant in hole.

(*See page* 259.)



For forcing Rhubarb choose a strong root such as this.

(*See page* 349.)

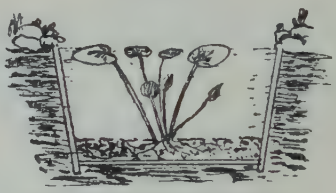
PROPAGATING AND PLANTING GERANIUMS

PROPAGATING ZONAL GERANIUMS. A, sturdy shoot with short joints. Remove the lower leaves and cut squarely beneath a joint at the base as shown. B, a weak, long jointed shoot, unsuitable for a cutting. Note that the basal cut is not at a joint. August is the best month for propagating.

(*See page* 185.)

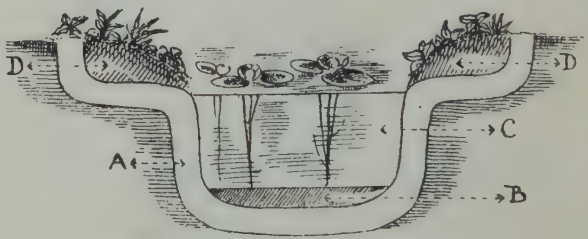
HOW TO PLANT A "LEGGY" ZONAL GERANIUM.

WATER LILIES IN TANKS, POOLS, AND PONDS



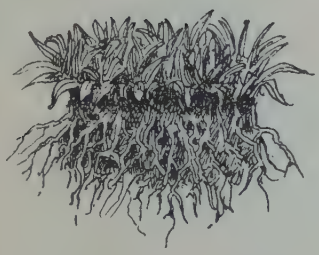
A Small Tank for Water Lilies

Making Pockets for Water Lilies in Pools. 1. Large stones; 2. soil; 3. plant; 4. water.



Section of a Water Lily Pond. A, concrete; B, soil at bottom of pond; C, water; D D, soil on "shelves" of sides.

(*See pages* 167, 296, 459.)



A crowded clump of perennial Aster, which ought to be split up, strong outside portions such as that on the right being chosen for replanting.

(*See page* 50.)

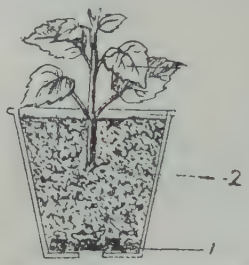
A Strong Division of Aster

How to Stake Herbaceous Plants. Note that the shoots are looped to the stake, not bunched.

(*See page* 211.)

Propagating Violets by Division after Flowering. A good portion for increasing stock.

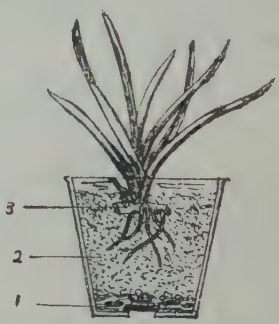
(*See page* 454.)



PROPAGATING SALVIA SPLENDENS BY CUTTINGS IN LATE SUMMER. 1. Drainage; 2. soil. (*See page* 368.)

PROPAGATING CAMELLIAS BY CUTTINGS. The cuttings may consist of matured young wood, and be inserted in summer in bottom heat. (*See page* 85.)

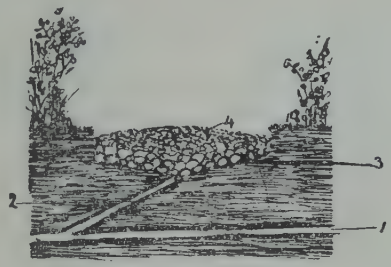
PROPAGATING EUCHARISES. An old potful is divided in early spring and the smaller pieces inserted in 5- and 6-in. pots. (*See page* 152.)



PROPAGATING YUCCAS BY ROOT CUTTINGS. 1. Drainage; 2. soil; 3. root cutting. Strike in gentle bottom heat. (*See page* 467.)

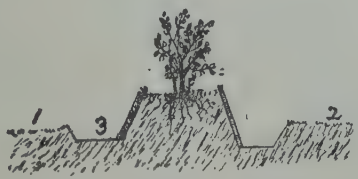
PROPAGATING DRACAENAS BY PIECES OF OLD STEM. 1. Drainage; 2. rough soil; 3. fine soil; 4. piece of stem. (*See page* 141.)

PROPAGATING CALADIUMS. 1. A tuber marked for division. (*See page* 81.)



How to Drain a Walk. 1. Main drain; 2. small drain; 3. rubble; 4. gravel.
(*See page* 457.)

Rock Steps with Plants
(*See pages* 166, 351.)



How to Plant a Hedge. 1, 2. Level of ground; 3. soil removed each side and made into a ridge.
(*See page* 205.)

BOUVARDIAS, COLEUSES, AND ASPLENIUMS

A Bouvardia cut back after Flowering to yield Shoots for Cuttings. 1. Mature shoots; 2. stem; 3. bud; 4. collar; 5. roots; 6. depth to pot.

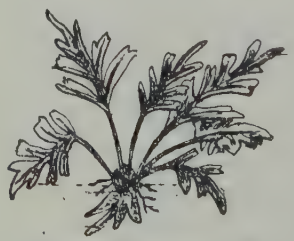
A Cut-back Bouvardia, which has produced a number of shoots suitable for cuttings.

(See page 69.)

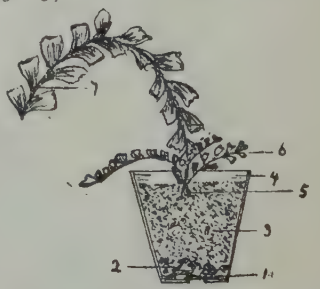
Stopping Coleuses. 1. Shoots breaking after the pinching.

Propagating Coleuses by Cuttings. 1. Drainage; 2. rough soil; 3. fine soil; 4. sand.

(See page 113.)

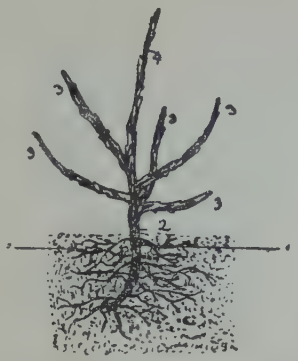


Propagating Asplenium by the Plantlets on the Fronds. The dotted line shows the depth to insert a plantlet detached from Asplenium bulbiferum.



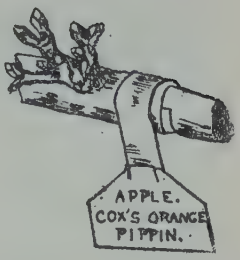
Propagating Asplenium by the Leaf Plantlets. 1. Drainage; 2. rough soil; 3. fine soil; 4. space for water; 5. base of plantlet; 6. young fronds starting; 7. old frond on a growing plant pegged down.

(See page 157.)



Fruit Stock Raised by Layering. 1. Roots which have sprung from layered stem; 2. main stem of stock; 3. side branches; 4. leader. This stock is now ready for budding or grafting.

(*See page* 34.)

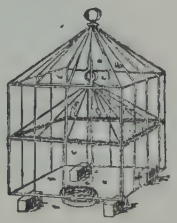


Safe Labelling of Fruit Trees. A metal coil, which expands as the branch thickens, carries the zinc label; no injury then accrues, as is often the case with wire.

(*See page* 179.)

Gall Weevil on Brassicas. If Greens or Turnips are stunted look out for swellings on the lower parts. *Left:* a gall sliced off showing the hollow interior, where there may be a grub. *Right:* the gall weevil.

(*See page* 72.)



A Trap for Wasps. One handlight is fitted over another, with a hole in the lower one. Wasps that enter cannot get out again.

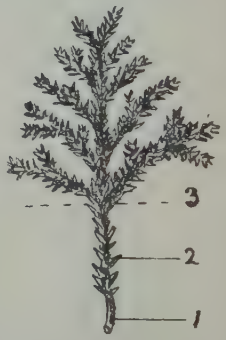
(*See page* 459.)

DIVIDING AND RE-PLANTING BOX. *Left:* an old clump marked for division. *Right:* division ready for planting; dotted line shows depth of insertion.

(*See page* 70.)

INCREASING GLADIOLI. 1. Large corm in autumn which has formed on the original one, then decaying (5); 3. spawn; 4. young corms forming.

(*See page* 187.



PROPAGATING CONIFERS. Cupressuses and Retinosporas may be increased by cuttings in sandy soil in autumn, preferably in a cold frame. 1. Base of Retinospora cutting; 2. side shoots removed; 3. depth of insertion.

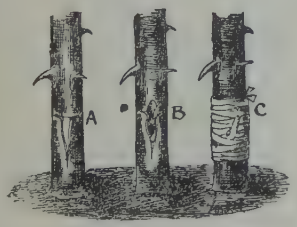
(*See also pages* 122 *and* 347.)

PROPAGATING POLYANTHUSES AND PRIMROSES. Plants which have been raised from seed may be increased by division after flowering. This tuft may be divided into two or four parts at will.

(*See page* 332.)

PRUNING RAMBLER ROSES. Pillar from which old growths have been cut out in autumn, and young shoots trimmed and tied in.

(*See page* 360.)

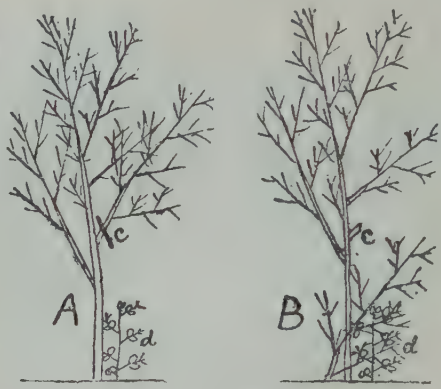


BUDDING DWARF ROSES. A, slit in the stem near the ground, made after scratching away the soil from the lower part of the stem; B, bud inserted; C, bud tied.

(*See page* 358.)

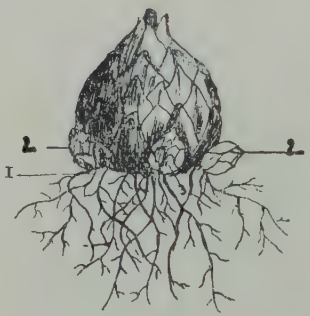
PROPAGATING ROSES BY CUTTINGS. Rose cuttings prepared and inserted in a cool place in early autumn.

(*See page* 358.)



STAKING SWEET PEAS. A, Hazel stick with side shoot marked for removal at bar *c*; note plant *d* at base. B, side shoot fixed in position to protect plant *d*.

(*See page* 406.)



INCREASING LILIUMS BY OFFSETS. The hardier Lilies frequently form offsets at the base, by means of which they may be increased. 1. Fibrous roots; 2. offsets to be removed.

(*See page* 264.)

TRAINING SMILAX. Smilax can be grown in a box in a greenhouse or vinery, and the shoots trained up strings attached to bamboo rods. 1. Box; 2. strings; 3, 4. bamboo rods.

(*See pages* 47 *and* 388.)

GRAFTING ORANGES. An Orange raised from a pip may be turned into a good fruiting plant if the stem is notched as shown above, and a shoot of a fruiting plant in a pot, stood alongside, is inarched.

(*See page* 301.)

PROPAGATING HELIOTROPE BY CUTTINGS. 1. Growing tip; 2. point of severance; 3. leaves to be removed; 4. depth of insertion.

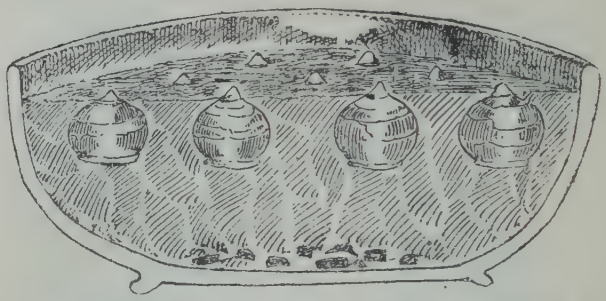
(*See page* 207.)

INCREASING LILIES OF THE VALLEY. The illustration shows how Lilies of the Valley extend by offsets in nature. Garden clusters may be increased by making divisions.

(*See page* 264.)

RAISING CINERARIAS FROM SEED. A seedling Cineraria ready for pricking off.

(*See page* 106.)

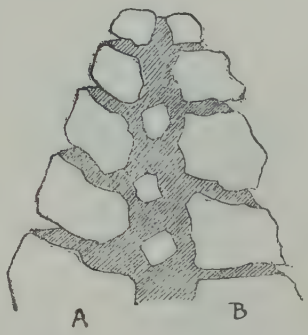


GROWING BULBS IN BOWLS OF FIBRE. Note arrangement of bulbs in triangles, with tips just above the surface. Note also pieces of charcoal below the fibre.

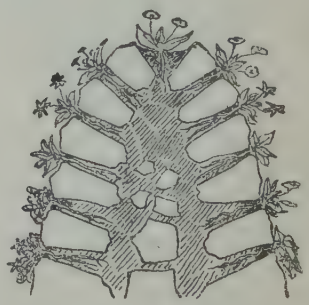
(*See page* 76.)

WALL GARDENING

(*See page* 459.)



SECTION OF A WALL FOR ROCK PLANTS. A, correctly built, stones so placed that rain will run in; B, incorrectly built, stones so placed that rain will run off.



SECTION OF A WALL WITH ROCK PLANTS. Showing how the plants should be placed.

LORETTE PRUNING

(See page 317)

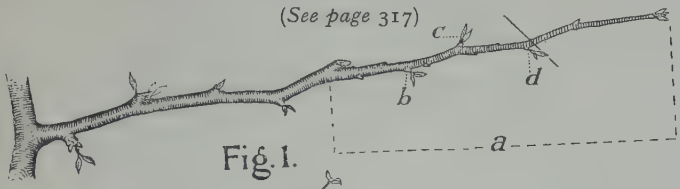


Fig. 1.

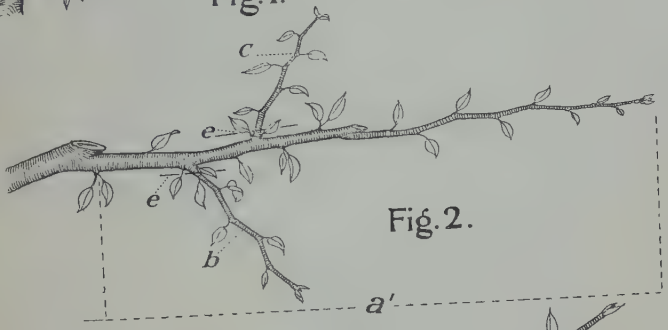


Fig. 2.

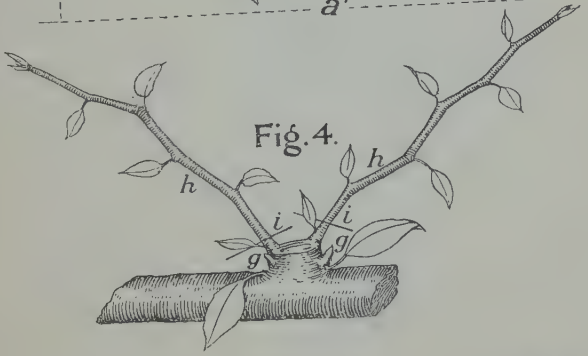


Fig. 4.

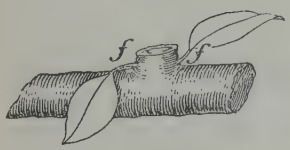


Fig. 3.

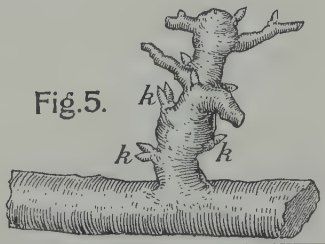


Fig. 5.

Made At The
Temple Press
Letchworth
Great Britain